Reviewer's report

Title: The association of levels of physical activity with metabolic syndrome in rural Australian adults

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Reviewer: Jean-Michel Oppert

Reviewer's report:

Major Compulsory Revisions

In this paper, Vaughan and colleagues describe the association of leisure-time physical activity levels with metabolic syndrome in rural Australian adults. They use data collected in three health surveys performed in random samples of the adult population from South-east Australia. Based on data from a simplified physical activity questionnaire, three levels of physical activity were defined: “inactive”, “low/moderate active”, “high active”. In this population, 15% of women and 20% of men were found inactive, 33% of women and 39% of men had the metabolic syndrome as defined by the International Diabetes Federation (IDF). The most frequent metabolic syndrome abnormality was increased waist circumference, followed by increased blood pressure. Using the “inactive” category as reference, the odds ratio (95% CI) for having the IDF metabolic syndrome was 0.41 (0.23-0.73) in men and 0.22 (0.10-0.48) in women, after adjustment for age, education, smoking and alcohol consumption. After further adjustment for either BMI or waist circumference, these associations no longer reached statistical significance. One conclusion is that “Specialised interventions that take rurality into consideration are required if adults who are inactive in leisure time are to include some PA in their lifestyles”.

This is an interesting paper, adding evidence to the importance of physical activity in relation to the metabolic syndrome in adults. The paper is well presented, easy to read and informative.

1. The authors emphasize the “rurality” of their sample. It is however unclear for an international readership why this population is qualified as rural and what is meant by rural in this Australian setting. Characteristics of the study population including education, smoking and alcohol consumption should be given.

2. In light of the previous comment, the conclusions of the paper about the need for “specialised interventions that take rurality into consideration” do not seem to follow from the data as they are presented.

3. Data collected about leisure physical activity in these surveys do not appear very sophisticated. It seems that some some domestic activity is included in the “low/moderate” category. This should be mentioned in the discussion. Also, “inactivity” as defined by these questions appears to include sedentary occupations. Since the authors indicate the importance of the ‘balance between
activity and sedentariness” (page 3), this may be mentioned in the discussion.

4. Tables 3 and 4 should be an integral part of the paper, instead of being shown as additional files.

5. For this reviewer, after additional adjustment for BMI (model 2) in women, there is no longer a significant relationship between physical activity and metabolic syndrome.

Discretionary Revisions

1. Page 3, 2nd paragraph: there is more in recent updates on physical activity recommendations than the 30 minutes of moderate intensity activity.

2. How does ref. 10 apply to the study of rural Australians? This indeed is of great importance since only leisure activity is considered in this paper.

3. Page 6, Table 2: Table 2 should show the same data for NCEP metabolic syndrome.

4. Page 10, line 3: add NCEP metabolic syndrome to Table 2 to strengthen this statement.

5. The authors may consider showing p for trends in Tables 3 and 4.

6. Page 11: BMI as a mediating factor in the relationship between physical activity levels and metabolic syndrome: the fact that BMI is (most often) highly correlated with waist circumference may be added here in the discussion.

7. Page 11, last paragraph: the fact that physical activity questions asked here are rather crude is also a limitation (see general comments).

Minor Essential Revisions

1. Page 5, 1st paragraph: the term “vascular risk factors” is not appropriate; it might be cardiovascular, cardiovascular and metabolic, or even cardiometabolic.

2. Page 13: the statement about weight loss seems a bit beyond what the data tell about BMI as a mediating factor in the relationship between physical activity and metabolic syndrome.

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

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I declare that I have no competing interests