Reviewer's report

Title: Association of physical activity with hypertension and diabetes mellitus among Malaysian adults: a cross-sectional study

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Reviewer: Sanjay Rampal

Reviewer's report:

The authors have investigated the association of physical activity with hypertension and diabetes mellitus among Malaysian adults. Using a large nationally representative cross-sectional survey, the National Health and Morbidity Survey (NHMS) 2011, they reported no clear significant associations with hypertension. They also reported a significant protective association comparing moderate to low levels of physical activity with the prevalence of diabetes, however, the lack of a dose response analysis of the exposure made it difficult to interpret the. This manuscript has good potential to contribute to the science of the specified field.

Major Compulsory Revisions

Abstract

• The authors stated in the abstract and conclusion on the need for measurement of clinical factors to help explain the associations of physical activity with hypertension and diabetes.

Clinical factors, as downstream effects of physical activity, would be mediators in these associations. How would the inclusion of clinical factors help the investigation of the null associations between physical activity and hypertension?

A more important factor may be the bias due to misclassification of the underlying exposure. Misclassification can also lead to overestimation of the prevalence estimates. Please elaborate further on these possibilities in the discussion. Consider revising the abstract and the conclusion of the main article.

Selection

• The NHMS 2011 investigators should be commended for operationally tried to reduce non-response.

• How was missingness addressed and was it ignorable?

• The sample size for the different analysis and tables are not likely to be the same due to missingness. Please include the sample size in the tables when it differs from one another.

• The abstract and text mentions sample size of 19,231 but table 1 mentions n=18,231. The other tables have no sample size to them and this makes it difficult to interpret.
Measurement

• What are the measurement properties of International Physical Activity Questionnaire-short form (IPAQ-SF)? Please provide the reference for this. I would also suggest to include a discussion misclassification bias and its possible effect on the studied null associations in the discussion.

• Has the OMRON HEM-907 been validated for measuring blood pressure? Has this electronic equipment been validated against other types of blood pressure measurement tools (e.g. mercury sphygmomanometer? Please provide the reference for this.

• What proportion of the sampled blood was taken from fasting individuals and how was non-fasting individuals accounted for in the results (Figure 1)?
• Blood glucose levels were measured using whole blood obtained by finger prick. Has this method been validated in this study or in prior literature using similar equipment? Please provide the reference for this.

Statistical methods

• “Multivariate logistic regression was used to estimate the association of hypertension and diabetes by physical activity level after controlling for other potential confounders (gender, locality, age, ethnicity, educational level, household monthly income, employment and marital status, time spent on sitting, BMI status and FVs intake)".

Referring the quoted sentence, it is not clear whether the regression model simultaneously adjusted for diabetes and hypertension. Did the multivariable model examining the association between physical activity and diabetes adjust for hypertension, and vice versa? If yes, then interpretation of the adjusted associations would be more complicated.

• Is BMI status a downstream effect (mediator) of physical activity? Adjustment for a mediator would attenuate the associations.

• For tables 2, 3, and 4, I would suggest some sort of dose response analysis of the exposure; for example a trend test. Please elaborate how this was performed in the methods and as footnotes under the relevant tables.

• Why was N presented in table 1? There is no explanation of N and how it was estimated in the methods section and also as footnote for the table. Should also decrease amount of precision by rounding to 10,000s or 100,000s. I would recommend to remove it from the tables to improve interpretability of tables.

Conclusion:

• Please revise after performing dose response analysis as current results does not support any linear associations between higher physical activity and diabetes.

• With regard to conclusion on association with hypertension, refer to my earlier comments.
Minor Essential Revisions

- “Urban area is defined as a gazette area of more than 10,000 populations and vice versa for rural area”. Please revise sentence to improve interpretability.

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

**Quality of written English:** Needs some language corrections before being published

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

**Declaration of competing interests:**

I declare that I have no competing interests.