Reviewer's report

Title: A case-control study of physical activity patterns and risk of non-fatal myocardial infarction

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Reviewer: Zubair Kabir

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Gong and colleagues have examined the risk of non-fatal MI in physically inactive individuals in Costa Rica employing a population-based case-control design technique and addressing the measurement of a complex exposure level such as physical activity levels through principal component analysis (PCA) technique.

Major compulsory revisions:

Cases were first time MI survivors selected from a hospital, while controls were frequency-matched to several factors (age, sex and residence) and were selected from the population randomly using the National Census and Statistics Bureau. My main concern is the lack of detailed information on the selection procedure of controls. Just mentioning ‘randomly’ selected (1:1) using the Census is patchy and inadequate. Whether a computerized matching program or random-digit dialling technique was utilized or not to select population controls from the source population is important to assess the degree of selection bias in this study design.

Second, recall bias and measurement bias is an inherent methodologically limitation of a case-control design. Although a standardized questionnaire and ‘trained’ interviewers were recruited for this study design to reduce recall and measurement biases, the extent of training and the numbers of interviewers trained were not reported in detail. Exposure misclassification bias is also a methodological challenge especially when self-reported information was used, despite using a previously validated questionnaire.

Third, income levels are not best indicators of socio-economic status and are not consistently available especially in low and middle-income nations. Educational levels capture socio-economic status better and such information was not available.

Fourth, table 1 indicates that matching failed to achieve a comparable background characteristic between cases and controls, especially in terms of smoking and other main cardiovascular risk factors, thus questioning the selection of controls in terms of the exposure of interest.

Fifth, conditional logistic regression modelling was performed simultaneously adjusting for the matching factors (age, sex and residence), which is technically
inappropriate for a matched case-control study analysis, thus influencing the effect estimates.

Sixth, weighting of MET variables for each component of physical inactivity level measured needs further elaboration.

Seventh, a U-shaped /J-shaped exposure-response association employing a case-control study design should be interpreted with caution, especially when a temporal sequence is unclear.

Finally, PCA for deriving physical activity levels is relatively novel and needs to be reproduced in different population settings for validity and precision, especially when individuals are studied.

**Level of interest:** An article of importance in its field

**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'