Reviewer's report

Title: Different associations between obesity and impaired fasting glucose depending on serum gamma-glutamyltransferase levels within normal range: a cross-sectional study

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Reviewer: Danxia Yu

Reviewer's report:

The authors examined whether the association between obesity and impaired fasting glucose was modified by liver enzyme GGT. They analyzed data from a cross-sectional survey of middle-aged Korean men and women and found that BMI was positively associated with risk of IFG only in subjects with elevated GGT, not in those with low GGT. Overall, the authors appropriately defined the question and described the methods and results, although redundant. I have some comments regarding their discussion, conclusion, and further data analyses.

Major Compulsory Revisions:

1. The authors cited several papers that reported an interaction between obesity and GGT on the risk of type 2 diabetes, but the present study failed to observe such an interaction. Comparison with previous studies is needed in the discussion. What about the association for newly diagnosed diabetes (participants with no history of diabetes but fasting glucose >126 mg/dl)?

2. Can the authors find an interaction between BMI and GGT that influences fasting glucose concentration as a continuous variable?

3. The authors may not want to conclude “obesity itself may not be a sufficient cause of T2D”, because BMI is not a good marker of obesity/adiposity, the present findings on T2D are not significant, and there is still a trend of positive association between BMI and IFG in the lowest tertile of GGT. What about using waist or waist-to-hip ratio?

4. Because of the cross-sectional design, it is possible that IFG happens before elevation of GGT or obese adults with low GGT are in an early stage and will eventually develop IFG. So the authors should fully acknowledge their limitations and not overstate the “important clinical implication”.

Minor Essential Revisions:

1. The current model was adjusted for frequency of alcohol drinking. It is better to consider the amount of alcohol consumption, as well as pack-years of cigarette smoking.

2. In the 1st paragraph of methods, can the authors provide the numbers of excluded participants due to different reasons?
Discretionary Revisions

1. Redundancy. For example, the abstract background is exactly the same as the 2nd sentence of introduction, which are also similar to the 1st sentence of introduction.

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

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

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.