Author's response to reviews

Title: The Association of vitamin D status and fasting glucose according to body fat mass in young healthy Thais

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The Association of vitamin D status and fasting glucose according to body fat mass in young healthy Thais
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We thank Reviewer I for the instructive comment and suggestion.

Responses to Reviewer I comments

Reviewer: Nansi Boghossian

Reviewer's report:
In this study, the authors examined the association between vitamin D status and fasting glucose in a group of young healthy Thais. Several issues should be addressed:

Major
• Did the authors examine graphically the relationship between vitamin D and FPG and found that it is linear?

Yes, we did as shown in the figure below. The linear regression coefficient for the relationship was 0.23, $P < 0.001$.

![Scatter plot of 25(OH)D levels vs. FPG levels with a linear regression line and correlation coefficient](image)

• Did the authors test first for the significance of the interactions and based on that subsequently stratified the data? I would expect to find an interaction between gender, body fat, and FPG. What about an interaction between age and FPG? All of these should be tested first.
We have checked the statistical interactions of body fat and gender with vitamin D status on their relationship to FPG. However, no significant interaction was detected.

- Body fat x total 25(OH)D: p = 0.39
- Age x total 25(OH)D: p = 0.31
- Gender x total 25(OH)D: p = 0.95

- Line 177: The lower circulating vitamin D among obese subjects is due to the trapping of the vitamin D in the adipose tissue. This mechanism is very different from a VDR knockout mice and such an analogy between the two should not be used.

Thank you for the comment. We rewrite the sentence to “In spite of the fact that most epidemiologic studies demonstrated lower circulating vitamin D is generally associated with increased adiposity [23], underlined mechanism of the association has not been well established. Nevertheless, the mechanistic studies of this correlation in mouse model are complex. For example VDR knockout mice were lean [11]” (line 179-183).

- The argument made about the differences in the association between FPG and vitamin D based on body fat mass is not consistent. Tertile 1 showed a positive association while the 2nd tertile showed a negative association and the 3rd tertile showed a positive association again.

We agree that the association between FPG and 25(OH)D levels is not consistent across tertile of body fat mass. But we demonstrated that only the positive association between FPG and 25(OH)D of subjects in the lowest tertile of body fat was significantly found.

- Are other measures than FPG available? Fasting insulin for example? Unfortunately, we did not have other metabolic parameters such as fasting insulin, HbA1c. We added this comment to the limitation of the study (line206-208).

- What about other measures that can potentially affect both diabetes risk and vitamin D such as calcium intake for example. We did not collect data about the calcium intake in this study. We added this comment to the limitation of the study (line210-212).

Minor

- Please provide a reference of the standardized techniques that were used in the measurements of the anthropometrics or describe the techniques briefly.

We provided the references described the techniques that were used in the measurements of the anthropometrics. (ref 17,line 94-95 )

- Page 7 line 135, the wording is contradictory strong positive association although weak.

We rewrite the sentence to “it was found that there was a significant association (p=0.01), although a weak positive correlation (r=0.097)” (line 137-138).

- Since the authors measured both vitamin D2 and D3, were the results any different from the total vitamin D measurement? Because 25(OH)D2 had a strong correlation with total 25(OH)D (r= 0.998, p<0.001) whereas 25(OH)D3 had a weak correlation with total 25(OH)D (r= 0.182, p<0.001). We further performed multiple linear regression analysis to identify the association
between FPG (the dependent variable) and 25(OH)D in each subgroup, stratified by gender, age group and tertile of total body fat. And all results were the same as using total 25(OH)D.

• Discussion line 145: Please elaborate on the difference between Caucasians and Asians has not been well recognized. Difference in what?
We rewrite the sentence to “The difference of this relationship between Caucasians and Asians has not been well recognized.” (line 147-148).

• Line 188. And is likely to decrease with age. What is the reference?
We added the reference number (ref no 26, line 193).

• No references cited for lines 196-199.
We added the reference number (ref no 28, line 204).

• Tables 1 & 2 can be easily combined. Table 3 can be included as text rather than have a table on its own.
Thank you for your suggestion. We combined table 1 and 2 and described data in table 3 as text (table 1 and line 132-133).

Level of interest: An article of limited interest
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