Author’s response to reviews

Title: Physical growth: is it a good indicator of development in early childhood in low- and middle-income countries?

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Author’s response to reviews:

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Professor João Valente-dos-Santos
Academic Editor
BMC Pediatrics

Dear Professor Valente-dos-Santos,

Re: Manuscript entitled “Physical growth: is it a good indicator of development in early childhood in low- and middle-income countries?”

We are really grateful for your appraisal and the reviewers’ thoughtful comments. We have endeavoured to address each one and have identified amendments in the manuscript with tracked changes. Please find attached our point-by-point responses to the reviewers’ comments and suggestions.

We hope our manuscript can now be considered for publication.

Yours sincerely,

On behalf of the authors

Thach Tran
Reviewer 1.

We thank Reviewer 1 for the positive comments and encouragement.

Reviewer 2

We are grateful Reviewer 2 for the valuable comments and suggestions. Please find below our responses to each comment.

Comment 1. Authors should give examples of which nations are low and middle income, it is relevant to the reader understand where these findings are fit the be applied;

Response: We have amended that sentence to add the information the reviewer suggested.

It now reads: “In countries classified as low- or middle-income in the World Bank country classification [3], for instance India and Nepal, child physical growth is often used as a proxy indicator of early childhood development.”

Comment 2. Second paragraph has no reference/citation to support the statements made. Please, insert it;

Response: We have added references to support our statements.

Comment 3. Authors should present clearly the relevance of this possible relationship between physical growth and early development, as well as possible implications related to this relationship (if confirmed);

Response: We have added a paragraph to provide the information that was sought. It reads:

“There is a debate about the relationship between child linear growth and development. Since Porter’s study of 33,500 students, which, for the first time showed that “taller students performed better academically than did shorter students of the same age”, several studies drew similar conclusions [6, 7]. Although the data were cross-sectional, all interpreted the relationship as causal and concluded that a child’s body growth can influence their cognitive function. However, it is also possible that common influences, e.g. the caregiving environment, may influence both these outcomes, thus playing a confounding role in this relationship [8].”

We have stated the possible implications of the relationship in resource-constrained settings. It reads:
“If the association is strong and consistent, child growth failure can be used as an indicator of risk of developmental delay, and national policies for the integration of ECD interventions into child growth promotion programs to address both outcomes can be recommended for resource-constrained settings [12].”

Methods

Comment 4. It is not sufficiently clear how the dataset was analyzed. Is this manuscript based in a ecological approach? Authors need explain in deep when the analysis is inside each nation and when the analysis is using the nation as the sample unit.

Response: We have added the information to explicitly describe the level of data each analysis used.

Comment 5. Coefficients is correlations should be accompanied by its 95%CI.

Response: We have provided 95% CI for the correlation coefficients in every country in Table 1.

Results

Comment 6. Results should be presented prefentially as figures.

Response: We have presented data of the country mean HAZ and mean ECD data in a visual representation in Figure 1. We would like to present other data in tables because it provides readers with the precise numbers for each setting.

Discussion

Comment 7. The relationship observed was mainly of low magnitude, even in a huge sample size. Pearson correlation is per se a measure os effect-size, so it is not clear if this relationship is "clinically relevant". Authors should discuss this issue better, mainly because it is not clear if this relationship would be different in high-income countries (a suggestion made by the authors);

Response: We had included in the Methods section the criteria to interpret Pearson’s correlation coefficient and adjusted standardised mean difference (SMD). It reads:

“The unadjusted estimation is the Pearson’s correlation coefficient (r) of HAZ and ECD scores: \(|r| \geq 0.50\) is considered large, \(0.30 \leq |r| < 0.49\) medium, and \(0.10 \leq |r| < 0.29\) small [25]”

“SMD is interpreted as the number of standard deviations in ECD scores that change for each unit increase in HAZ. \(|SMD| \geq 0.80\) is considered large, \(0.50 \leq |SMD| < 0.79\) medium, and \(0.20 \leq |SMD| < 0.49\) small [25].”
Those criteria guided all our interpretations of the correlation between child growth and development indices. We had discussed the association among HDI groups and regions. We have added a paragraph to discuss this in high-income countries. It reads:

This study did not include data from high-income countries. In the past, studies in these settings have suggested a significant association between child linear growth and child cognitive ability [6-8, 32]. However, the effect size of the associations have not been analysed systematically using nationally representative data for each country. The socio-economic characteristics of high-income countries are substantially different to those of low- and middle-income countries and lead to substantial differences in the caregiving environment for children. Therefore, the question of whether child growth can predict the ECD index in high-income settings remains.

Comment 8. Please, explore better the limitations of the study.

Response: We have acknowledged the three limitations of this study, which relate to the measure of ECD, the lack of data on factors common to child growth and development, and that only data about children aged from 3 to 5 years are available. We are confident that these are the only major limitations of this study.

Comment 9. I was wandering if the relationship would be stronger if other markers of physical growth were used. Please, this aspect should be explored.

Response: We have added a paragraph in the Discussion section to discuss about this point. It reads:

“We use height-for-age as the index of child growth in this study. There are several other common indicators of child growth that can be used including weight-for-age, weight-for-height, body mass index (weight in kg divided by height in metres squared), mid-upper arm circumference, and head circumference. Height-for-age is regarded as the best child growth indicator because it reflects cumulative linear growth and can be measured accurately using a widely available tool and a standardised method [10]. Other methods that are related to weight can be confounded by short-term problems like starvation or severe disease. We have repeated the analyses using weight-for-age and weight-for-height z-scores as the indicator of child growth. The results were relatively similar to the results of height-for-age z-scores (Please contact the authors for the results). Therefore, we are confident that the main findings of this study would not change if we used another indicator of child growth.”