Reviewer’s report


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Reviewer: Tamara Blake

Reviewer's report:

This is an impressive study and I commend the authors on their detailed data collection and analysis. As mentioned by the authors, studies of this nature are vital to validating the use of the GLI equations in populations not included in the original study. I believe this studies results will be of great benefit to the Zimbabwean population. The manuscript is generally well written and clearly reports the major findings. I have some queries and suggestions as outlined below.

Introduction

- Page 4 line 40: The authors appear to have listed regions/groups of data rather than (understandably) listing the 33 countries that contributed data. However, several contributors of data are missing from this sentence including Europe and Australia and in fact, data from Japan was not included in the GLI dataset due to publishing embargo. This sentence needs some clarification.

- Following on from the point above, it would be beneficial for readers to know what the race-specific reference equations are (i.e. Caucasian, African-American etc).

Methods

- Could the authors provide some additional information into the differences between the three economic zones? Furthermore, what was the breakdown of participants from each of the schools? Was there an even distribution in numbers recruited, age range and gender ratios?

- Page 7 line 7: The authors have written "exhalation phase (≥ 6 seconds in ≥9 year olds and ≥3 seconds in <9 year olds)" however current guidelines list 10 years of age.

- The rationale for the comparison of the GLI equations against the ECSC references needs to be mentioned in the aims. It is not until the discussion that mention is made of the ECSC references being current clinical practice.

- Page 8 line 58: Please add a reference the last sentence of the methods section.

- The abstract mentions that participants with a BMI z-score < -2 were excluded however this is not mentioned in the manuscript.
Results

- Could the authors please clarify the number of participants who failed to perform technically acceptable spirometry. In the manuscript, (page 9 line 10) 33 participants were excluded however in figure 1, 19 are listed as failing ATS/ERS guidelines and 14 had outlying values. What was considered 'outlying values'? It would be inappropriate to remove these participants if they simply had too high or too low values.

- I admit that I am unfamiliar with the shapiro-wilk test and Q-Q plots however I found this section difficult to read and understand as they appeared to say opposite things. Shapiro-wilk test = not normally distributed, Q-Q plots = normally distributed.

- Page 9 line 49: The sentence "compared to other ERS/GLI2012 ethnic modules which were also generally within ±0.5 of zero" is not accurate. Based off table 2, only South-East Asian for FVC and Caucasian/North-East Asian/Other for FEV1/FVC meet this criterion. In it's current format this sentence suggests that other reference equations may also be appropriate for this population which is not the case. This sentence also appears in the results section of the abstract.

- Can the authors please justify why the scatterplots are not further separated according to gender? When looking at the numbers provided in the text, (page 10 lines 9-14) more male participants had z-scores above the LLN for both FEV1 and FVC compared to females. Was the distribution of females below the LLN consistent across the age range? Could there be bias in the female participants?

Discussion

- I feel that the opening paragraph needs to better highlight which of the GLI2012 reference equations is the most appropriate for this population. For example, the final sentence states "the ERS/GLI2012 reference values are applicable" … which ones? All of them?

- Similarly to the above point, the sentence "mean z-scores for all the spirometry variables were within 0.5 z-scores from zero" … this was not true for all of the GLI2012 equations (Caucasians, North-East and South-East Asian). This clarity should be included in several sentences throughout the discussion as well as in the abstract.

- Did the authors collect any information on other known influencing factors to lung development including low birthweight/preterm birth, adverse childhood respiratory events and number of hospitalisations? If not, this should be acknowledged as a limitation.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

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