Reviewer's report

Title: Adherence To Non-Polluting Biomass Fuel Stoves Improves Respiratory and Sleep Symptoms in Children.

Version: 2
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Reviewer: Michael Tunik

Reviewer's report:

Statistical Review

Adherence To Non-Polluting Biomass Fuel Stoves Improves Respiratory and Sleep Symptoms in Children.

The authors use a 29 item questionnaire before and after the installation of an externally vented cooking stove to determine if the use of this stove improves on respiratory and sleep symptoms in children.

They use a pre post design, and paired analysis (chi square or fischer exact test) comparing the number of children with respiratory and sleep symptoms in each of 3 groups: Group 1 use of new stove exclusively, Group 2 mixed use of new and old stove and Group 3 exclusive use of old stove. This approach is reasonable for an item by item analysis.

The authors note in a prior publication validating this questionnaire (Spruyt K, Gozal D: Screening of pediatric sleep-disordered breathing: a proposed unbiased discriminative set of questions using clinical severity scales. Chest. 2012, 142:1508-1515) that the most important items in this questionnaire that are predictive of more severe sleep apnea are:

- shake child to breathe, apnea during sleep, struggle breathing when asleep, and breathing concerns while asleep, followed by loudness of snoring and snoring while asleep.

The focus of their analysis in this manuscript is “The major questions for this study included whether the child snored or not, and if so, the severity of snoring (loudness and frequency).”

The data that is presented demonstrates a significant pre v post differences in 6 items (below) only the first item was most predictive of severe sleep apnea in the above reference. Significant differences are noted in:

- Problems during sleep, ease of falling asleep, sore throat, ease of waking up, willingness to go to bed, and morning headache.

The authors count the number of items that show statistically significant improvement in each of the 3 groups as evidence that there is a greater
improvement in the vented stove Group 1 compared to the other 2. This analysis approach depends somewhat on an equal weighting of each of the 29 questions, which does not appear to be the case from the quoted reference.

Recommendation 1 – Please clarify in methods that there is an inherent weighting or greater importance to 6 of the questionnaire items, and state which 6 of the 29 items they are.

Recommendation 2 - Please note in discussion (limitation) that the study was underpowered to identify differences in most of these 6 items, as many had a very low proportion (< 10 %) in the pre group, and therefore given the small number of children in all 3 groups, would be unable to demonstrate a statistically significant decrease in these 6 items, even if the percentage in the post analysis was 0.

Major Compulsory Revisions

Recommendation 3 – At the end of the results section, “stoves exhibited significant improvements in the largest number of questionnaires items (n=6/28; Table 1) compared to those alternating use of the 2 stoves (n=1/28; p<0.05), as well as those not using the improved stoves (p<0.001).”

1) Please explain what statistical test was used to obtain this first p value. A fisher’s exact test of 1/27 compared to 6/22 is not statistically significant at the p <0.05 level, this fisher’s test is p=0.1.

2) What is the proportion in the end of this sentence (non improved stoves)? There is a p value (p<0.001) but no proportion to compare to.

Thank you for the opportunity to review this manuscript.

Michael G Tunik, MD

Level of interest: An article whose findings are important to those with closely related research interests

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'