Reviewer's report

Title: Outdoor exposure and vitamin D levels in urban children with asthma

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Reviewer: Lena Lämmle

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Review NJ – Outdoor exposure and vitamin D levels in urban children with asthma

Even though the manuscript has its strengths (e.g., the underlying idea of the study, longitudinal data), numerous weaknesses and limitations were evident that dampened my enthusiasm. A primary weakness of the manuscript is that a control group without asthma is lacking. Then, in the result part, a great deal of relevant information is not provided, so that I am not able to follow all of this and must consequently trust the interpretation of the authors. Furthermore, in my opinion, the wrong statistical analyses are used.

Abstract

There is a lot of information missing in the method part: how many measurement points, duration of the study, gender information, evaluation tools, etc.

Results: how do you define a modest increase? I don’t think that there are no seasonal variations: please also provide effect size. However, you should discuss this result. How strong is the correlation? And you did not introduce IgE levels.

Conclusion: I think that the conclusion of dietary supplementation is very strong based on your data and the results. See also the following.

Introduction

In general: I think the introduction part is really poorly structured (see in the following). Then you also present information which has nothing to do with your research questions (e.g., you do not analyze the effect of vitamin D on cardiovascular processes). Then you switch between the ages, which is confusing. What is the current state in childhood? In summary, I think you have three research questions: 1 prevalence of vit D, 2 relation to time spent outdoors, 3 relation of asthma and Vit D. So why don’t you structure the introduction part in that way?

- P3 L2 Reasons for what? Getting asthma?
- P3 L5 I do not understand the “for example…” sentence in this context. You should first write that there is a correlation between asthma and Vit D and then write that it is necessary to analyze if such populations have deficiencies in Vit D and if there is a moderation effect of Vitamin D. I think that this is your research
question.
- P3 L15 You cannot conclude this. What you can say is that there is evidence that it should be analyzed if there is a relation.
- It is not clear if you would like to analyze a black population or if this is just a characteristic of your sample. This is my impression after reading the abstract. Sample effects should be discussed in the end.
- Be careful: for me it sounds like a prejudice that African Americans have an indoor lifestyle.

Subjects and Methods
In general: You should have at least one control group: one without asthma. Also a white population control group seems to be necessary to me, after reading the introduction part (you don’t treat it as a sample effect…). And I am confused as to which measure you need for which research question. Also it is not clear to me which parameters are used in the regression analysis. And why didn’t you analyze moderation effects?
- You only measured vit D at baseline?
- What is your argument that you use guidelines for bone health as guidelines for asthma?
- Is the information on allergies relevant for your research questions?
- Reliability information is needed. Is there any information available on quality criteria for the questionnaire? Any publication? Otherwise you should present it.
- Statistical analysis: where is the gain of your longitudinal data? Is the vitamin D status predictive for 12 months? Provide empirical evidence! You should rather analyze path analysis along with latent growth curve analysis. Or only use baseline information….
- Effect sizes are needed.

Result
In general: again, I’m confused. A lot of information is missing (like which parameters are used within multivariate regression models? Which methods are used: enter? Did you observe multicollinearity? How high is the R2?
- “There was no association between the average daily hours spent outdoors and baseline 25-OH D levels (p = 0.49).” ??? This information is also different to the information provided in the abstract. And I do not understand the sense and use of the two following sentences.
- Effect of season: you should give information why there is no effect of time spent outdoors: this is really surprising…
- Provide all the information needed for multiple regression.

Discussion
In general: Again it is not structured with regard to the research questions. Then again I’m not sure if you talk about adults or children. Then you report on
information which has nothing to do with your research question.

**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.