Reviewer's report

Title: Skin pigmentation, sun exposure and vitamin D levels in children of the Avon Longitudinal Study of Parents and Children

Version: 1 Date: 9 December 2013

Reviewer: Philippa Youl

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This is an interesting article that further explores the issue of the genetics of skin pigmentation and the relationship between sun exposure and vitamin D levels. Currently there is a much debate around the issue of vitamin D, sun and health. Unfortunately much of this debate is occurring before the science has provided us with some potential answers. There are some concerns regarding the measures and timing of the surveys which require clarification.

Minor essential revisions

Introduction

1. In the introduction the authors mention one hypothesis relating to variation in skin pigmentation and indicate that other hypotheses have been suggested. The inclusion of a brief description of these hypotheses would be beneficial to the background.

2. In the second paragraph the authors indicate that age, clothing and sunscreens which block UVB decrease the photosynthesis of vitamin D in the skin. I would suggest that this be re-worded as more recent data suggests that sunscreen does not affect vitamin D levels.

3. For readers who are not fully conversant in pigmentation genetic scores, it would be helpful to include a brief description of what these are according to the Bonilla reference.

4. In the last sentence in the introduction the authors indicated they wished to determine if “excess sun protection measures” affect vitamin D status, but they do not describe what they mean what these excess measures are.

Methods

1. The authors indicate that the presence and number of moles was validated in a sub-set of children but do not mention what proportion this represented.

2. There have been many questionnaires and measures used in this study and it is a little confusing in the current form to understand what was measured and when. For example, moles were only measured at 15 years and freckling appeared to be measured at about 4 and 5 years. What may be helpful is to have a table summarizing the measures used for this study and their respective time points. This could be provided as an appendix table.

3. How was “bad sunburn” defined?
4. For the measure ‘time spent outside in the sun’ was this over a year?
5. Please include the age range when the 25(OH)D sample was taken. Also include the number of samples at age 9, and then at the year 11 and 7 year assessment.
6. Was residential history collected? Was history of vitamin D supplementation collected? If not then this should be acknowledged in the limitations.

Results
1. In supplementary table 2, I was interested to see that more than 80% of males and over 75% of females reported skin that tans easily and rarely/never burns (if I have read this correctly?). Do the authors know if this is fairly representative of the population?
2. Currently there are many tables both within the manuscript and as supplementary tables. I wonder for ease of reading whether combining the tables 3, 4 and 5 which focus on the 25(OH)D value according to a variety of scores would help?
3. In reference to educational level of the mother could the authors add in a footnote to the relevant table to explain what an ‘O’ level is for readers outside the UK.

Discussion
1. It was interesting to note that differences in the pigmentation traits between girls and boys, however the mean pigmentation genetic scores did not vary by sex. Do the authors have any theories that may help to explain this?

Major compulsory revisions
1. I was a little confused when in the limitations the authors indicated that pigmentation characteristics and sun exposure variables were measured only once, yet in the methods section, the way the sentence is worded it appears that these variables were collected more than once (see page 7, lines 10-11). This requires clarification and depending on the answer may have implications for the analysis.

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

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
I declare that I have no competing interests