Reviewer's report

Title: The association between indoor temperature and body mass index in children: the PIAMA birth cohort study

Version: 2 Date: 22 September 2013

Reviewer: Denise Heppe

Reviewer's report:

Major Compulsory Revision

First of all I would like to thank the authors for their detailed response to the authors. I agree with all their changes or comments to the suggested changes except for the one addressing how the authors' speculations were barely based on scientific evidence.

In my opinion the “Results of other studies and interpretation of the present study” part in the Discussion as well as the conclusion remain of suboptimal quality and need to be thoroughly revised.

Reviewer: The suggested explanation for the findings is not very well founded. It is not unlikely that there may be no association between indoor temperature and BMI in childhood. At least, this should be one of the explanations suggested.

Author: This point was partly addressed in our reaction to the reviewers first two comments. If we understand the reviewer correctly, she here suggests as a possible explanation for our findings that an association between indoor temperature and BMI in childhood may simply not exist. We are convinced, based on theoretical grounds and on experimental studies, that an inverse association between ambient temperature and energy expenditure exists: at lower ambient temperatures more energy is needed to maintain body temperature. Based on this consistently found inverse association between ambient temperature and energy expenditure, an association between indoor temperature and BMI was suggested. We observed no evidence for this hypothesized association with BMI. This implies that energy
balance was not
affected by differences in indoor temperatures. In our opinion this could be
explained by the
compensatory mechanisms speculated on in our paper: more clothing and
bedding in colder
environments so that energy expenditure is not increased or reduced energy
intake compensatory mechanisms speculated on in our paper: more clothing and
bedding in colder
environments so that energy expenditure is not increased or reduced energy
intake

I do not agree with the authors perspective. The hypothesis of this study was
based on theoretical extrapolation of results from experimental and ecological
studies and one earlier cohort study (low level of evidence). The authors
performed a well-conducted study in a large cohort and their results do not
support the proposed hypothesis. The suggested mechanism may indeed explain
the absence of significant findings, however there could be many other
mechanisms. And, more importantly, there may also be many reasons, not
addressed by this or any other study, why no association exists. For example,
why couldn’t it be the case that the body undergoes certain adaptations when
exposed to a lower temperature for a longer period to compensate for the higher
energy expenditure?

Therefore, I think that the authors should also consider and discuss the
possibility that there is no association and more carefully mention the suggested
mechanism as the evidence used for this speculation is of very low level of
evidence.

Please revise “We speculate that families that … been confirmed in other
studies.” as the speculations in this part do not include citations. I propose the
authors change the order of the sentences and start with describing what
Mavrogianni et al. (or others) suggested (in its perspective of level of evidence;
study type/quality/size etc) instead of starting with describing what they “think”.

Also, I am not sure if readers understand what the authors are trying to suggest
by “One of these experimental studies … did standardize for clothes and bedding
[14].“ as no actual suggestion is mentioned.

Further, my suggestion would be that the authors describe the only study that
has previously assessed this hypothesis in a non-experimental setting in more
detail and point out the differences or similarities between this Italian study and
the current study. Potentially, there may also be differences between the
experimental and real-life setting that may explain the differences in findings.

Please remove “but we think that our null finding reflects the reality in this
population and is not the result of any study limitations.” as you cannot be sure.

Please remove or change “As long as the results of Bo et al. have not been
confirmed in other studies.” into a more general statement. It is not clear what
exactly is suggested, yet it seems that the authors suggest that the results of Bo et al. reflect the truth and the results of the current study don’t?

Please revise “The results of our study do not necessarily contradict the hypothesis that historic changes in domestic temperatures may have contributed to the increase in the prevalence of obesity.” as the results of this study do contradict this hypothesis.

Please revise “As long as the results of Bo et al. have not been confirmed in other studies, we therefore consider it premature to recommend turning down the thermostat as a measure to prevent overweight.” into something more refined (see earlier comment).

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.