Author's response to reviews

Title: Factors associated with early menarche: results from the French Health Behaviour in School-aged Children (HBSC) study

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To the Editor of BMC Public Health

Article title: Factors associated with early menarche: results from the French Health Behaviour in School-aged Children (HBSC) study
MS ID: 1331342090337167
Authors: A Gaudineau, V Ehlinger, C Vayssiere, B Jouret, C Arnaud and E Godeau

Dear Sir,

We thank you for your response concerning our manuscript entitled “Factors associated with early menarche: results from the French Health behaviour in school-aged children (HBSC) study” (MS ID: 1331342090337167) to be considered for publication as an original article in BMC Public Health.

The research described in this manuscript expands our understanding of adolescent health by examining whether early pubertal development (measured through early menarche, e.g. before 11) is associated with higher risks of poor health. Data strengths include the use of a large nationally representative sample of girls and the use of a well established and scientifically valid survey, the Health Behaviour in School-Aged Children Survey, conducted each 4 years in more than 40 industrialized countries under the auspices of WHO.

The findings suggest that early menarche is associated with having had more than two life-drunkenness episodes, early sexual initiation and overweight, when controlled for familial environment. One can hypothesise that early-maturing girls could affiliate with older adolescents, hence engage in risk behaviours linked to their appearance rather than their maturity level. Such findings have implications for the planning of adolescent health programs: they highlight the need to raise awareness towards early-matured girls to prevent further health problems linked to associated risk behaviours as well as the overall need to reinforce prevention around puberty.

We have taken care to address all the reviewers’ comments and revised the manuscript accordingly, making clarifications in the text and, in a separate document (below), listing our responses in regard to each reviewer’s suggestions.

We thank you for giving us the opportunity to revise the manuscript and resubmit it to the journal and we look forward to seeing the results of your review.

Yours sincerely,

A Gaudineau
(Corresponding author)
Response to reviewers

Reviewer 1:
Comment 1: The meaning of “declarative statements” is unclear.
In the methods and the discussion sections, we have replaced “declarative statements” by “self-perceived determinants of health” to clarify the meaning.

Comment 2: The authors choose a cutpoint of 11 years for defining early menarche. This raises the issue of what is the most appropriate threshold in screening for a high-risk group. I suggest that they consider exploring various cutpoints (perhaps using a ROC analysis) to confirm what is most appropriate.
We agree with the reviewer that the cutpoint for defining early menarche and subsequently screening for a high risk group is debated in the literature and this has been raised in the manuscript. Our study was based on an anonymous classroom-administered self-questionnaire; it was neither possible nor planned to perform any clinical examination of the participating pupils. Therefore, we didn’t have any independent diagnosis of early menarche and we were unable to perform any ROC analysis. As in most studies, we defined early menarche using the 5th percentile of the observed distribution of age at menarche in our population. This has been added in the text as such: “In this study, we hypothesized that anomalies in pubertal timing could be defined using the 5th percentile of the observed distribution of age at menarche in our population”. Beside, the found age of 11 years was in accordance with the published definitions.

Comment 3: Previous studies on this topic have found that the family environment is associated with early menarche. The present study treats family environment variables as covariates (Table 2). However, the authors do not report whether these family environment variables are associated with early menarche in the multivariate model. These findings need to be reported
This is an important point risen by reviewer 1. In this paper, we have chosen not to report these findings because we were not interested in studying the relationships between early menarche and familial environment characteristics specifically as it has been previously reported in several studies. Therefore, we have clarified the objectives of the study to be consistent with our way of analyse the data: “The objective of this paper was to examine multiple factors (school context, physical/psychological factors and risk behaviours) associated with early menarche…” (in the text and the abstract). However, because of this well known association, we decided to control for family environment whatever the level of the statistical association found in the univariate analysis (and not to report on them). We specified in table 3 that the results were controlled for family structure, parental employment and FAS, variables which remained significantly associated with early menarche in the final model.
Comment 4: The Discussion speculates that girls with early menarche look older and associate with older adolescents, leading to increased deviance and substance use. However, there are no data presented to support this. Unless there is some evidence showing that this is the mediating mechanism, this interpretation needs to be more tentative. The findings on lower peer acceptance might be interpreted to mean that these girls are more socially isolated rather than affiliating with older girls.

In order to answer to this comment, the authors have changed the initial manuscript, by citing more literature, as such: “The mediating mechanisms at stake to understand the association between risk behaviours and early menarche is still debated in the literature. According to some authors, early pubertal development could result in affiliation with older adolescents, who often experience increased deviance and substance use [27]. Therefore, affiliation with an older peer group putatively increases the risk for initiation and addiction because of greater availability of substances, peer modelling of use and biased perceptions of substance use norms. Early-matured girls may therefore face pressure to engage in behaviours appropriate to their appearance rather than their experience, coping or cognitive abilities [28]. For others, early pubertal development could lead to depression and more frequent risk behaviours [11, 17, 24, 28]. From our results, we cannot conclude on this hypothesis: though the association of lower peer acceptance with early menarche is significant in univariate analysis (table 1), the cross-sectional methodology with self-perceived determinants of health is submitted to various biases.”
Comment 5: There is literature associating early menarche with depression. The “recurrent health complaints” variable contains some psychological symptoms and some physical. Given the overall association is significant, the authors should do a post-hoc analysis to check whether the association applies to all complaints or only the more psychological ones.

Recurrent health complaints encompass psychological and symptomatic symptoms: depression, irritability, nervousness, sleeping troubles, headaches, stomach-aches, back-aches and dizziness. However, subjective health complaints are not intended to measure specific, diagnosable psychological (nor physical) illnesses, such as depression. Beside, it has been shown that they tend to cluster together [1-3] and as a consequence, can cause immense burden on the individual. The sum score of the HBSC symptom checklist has been validated in 12 European countries within the large field study of an European project (n=22,000). Moderate to high correlation with scales measuring Psychological well-being (r=-.47), Depressive Moods (r=.53) and Physical well-being (r=-.42) have been observed [4-5]. Beside, a notion of quantity had been added in the recurrent health complaint with a threshold of two symptoms or more at least once a week. However, as interestingly suggested by reviewer 1, the authors have conducted a post-hoc analysis, to check the relation between early menarche and each individual symptom included in the recurrent complaint measure.

Table 1 given below (not shown in the manuscript) details psychological factors associated to early menarche in our population. When considered individually some psychological variables seem associated to early menarche (feeling depressed, irritability, nervousness) but not significantly when studied altogether (p=0.098).

Table 1: Psychological factors associated to early menarche in 1072 girls aged 15 years. Univariate analysis.

<table>
<thead>
<tr>
<th>Psychological symptoms</th>
<th>Early Menarche (N=57)</th>
<th>Menarche ≥ 11y. (N=1015)</th>
<th>OR (95% CI)</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling depressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>35 (61.4)</td>
<td>769 (75.8)</td>
<td>1</td>
<td>0.007</td>
</tr>
<tr>
<td>≥1</td>
<td>22 (38.6)</td>
<td>245 (24.2)</td>
<td>2.0 (1.1-3.4)</td>
<td></td>
</tr>
<tr>
<td>Irritability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>31 (54.4)</td>
<td>709 (69.9)</td>
<td>1</td>
<td>0.015</td>
</tr>
<tr>
<td>≥1</td>
<td>26 (45.6)</td>
<td>305 (30.1)</td>
<td>1.9 (1.1-3.3)</td>
<td></td>
</tr>
<tr>
<td>Nervousness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>30 (52.6)</td>
<td>665 (65.6)</td>
<td>1</td>
<td>0.049</td>
</tr>
<tr>
<td>≥1</td>
<td>27 (47.4)</td>
<td>349 (34.4)</td>
<td>1.7 (1.0-2.9)</td>
<td></td>
</tr>
<tr>
<td>Sleeping troubles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>32 (56.1)</td>
<td>649 (64.1)</td>
<td>1</td>
<td>0.213</td>
</tr>
<tr>
<td>≥1</td>
<td>25 (43.9)</td>
<td>364 (35.9)</td>
<td>1.4 (0.8-2.4)</td>
<td></td>
</tr>
<tr>
<td>At least one symptom</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>16 (28.1)</td>
<td>396 (39.1)</td>
<td>1</td>
<td>0.098</td>
</tr>
<tr>
<td>≥1</td>
<td>41 (71.9)</td>
<td>617 (60.9)</td>
<td>1.7 (0.9-3.0)</td>
<td></td>
</tr>
<tr>
<td>Recurrent health complaints</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>16 (28.1)</td>
<td>489 (48.3)</td>
<td>1</td>
<td>0.005</td>
</tr>
<tr>
<td>yes</td>
<td>41 (71.9)</td>
<td>524 (51.7)</td>
<td>2.4 (1.3-4.4)</td>
<td></td>
</tr>
</tbody>
</table>
From these findings and the evidence of the literature about this scale, the authors propose not change the manuscript relatively to this matter.


Reviewer 2:

Comment 1: The potential limitations of the study are the retrospective answers about the age of menarche in the anonymous questionnaire which may be not precise enough and small number of girls with early menarche. The authors are advised to mention that in the manuscript.

The authors acknowledge this is a very important matter and a potential limitation of such works. This is the reason why in the Discussion section, we discuss various arguments found in the literature showing that a retrospective report on age at menarche is still accurate: “Age at menarche, because easy to determine and to memorise, serves as an estimate in many studies [39]. Information on age at menarche is often retrospectively identified in most studies [40], hypothesising that menarche is a memorable event in a woman’s life. Previous studies have shown a good correlation between stated and real age at menarche within a 4-year-recall period [40]. Because in this study, girl's ages range from 14.6 to 16.4 years, the authors made the assumption that the memory bias could be neglected. The association [the authors] found could in fact be even stronger than shown because of possible biases due to self-declared statement - although questionnaire was validated from previous HBSC studies in the same context - and the lack of power of analysis (by definition, early menarche was rare).”

Therefore, the authors believe they have provided the requested information by reviewer 2 on the underlined limitations and the manuscript was left as it was.
Editor

We would also like to ask you to clarify the ethics statement of your manuscript and specify whether the "French National Commission of Computer Science and Freedom" acted as the local committee for your study.

HBSC requires from its participant that they obtain approval to conduct the survey from the relevant ethics review board or equivalent regulatory institution at country level. In France, the French National Commission of Computer Science and Freedom, acts as the national review board for surveys involving people and data management. Beside, the HBSC survey, being a school-survey, gets the approval of the Ministry of Education at national level. Parental consent is obtained through an approved passive procedure. Students can refuse to fill in the questionnaire, even in the case where their parents had approved their participation. All guaranties of confidentiality and anonymity are insured and given to the students prior filling-in the questionnaire.

The text of the paper has subsequently been revised in the methods:

“The self anonymous classroom-administered questionnaire was developed by the HBSC international research network. All items were piloted and pre-tested at international and national levels prior to the main survey [12-15]. Parental consent was assessed. At students’ level, participation in the survey was voluntary, with assurances provided in relation to confidentiality and anonymity. Age at menarche was derived from the following question: “Have you already had your periods?” with possible answers: “No, I haven’t yet” / “Yes, I have at the age of: (year, month)”.

As well as:

The study protocol was approved by the Ministry of Education and the French National Commission of Computer Science and Freedom, as the national review board for surveys involving people and data management.