Author's response to reviews

Title: A correlation study between the prevalence of chronic pain and academic pressure in adolescents in China (Shanghai)

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Author's response to reviews: see over
Comment One

Reviewer's report
Title: A correlation study between the incidence of chronic pain and academic pressure in adolescents in China (Shanghai)
Version: 2 Date: 18 February 2015
Reviewer: Viveca Östberg

Reviewer's report:
The questions posed in this manuscript are well-defined, timely and important, i.e. the occurrence of somatic pain in adolescents, and how school pressure may impact on these complaints. This study has gathered data from almost 3000 adolescents in the Chinese context and can thereby provide a valuable contribution to this field of research.

Major essential revisions
The outcome - Chronic pain
1. Considering that the aim is to estimate the prevalence of four types of pain through questionnaire responses the wording of the questions should be stated in ‘Methods’, including the time frame used (e.g. pain occurring within the last x months). That the pain measured here, with the chosen limits regarding time frame (3 months?) and occurrence (at least once a week), is to be regarded as ‘chronic’ needs to be argued for. Other similar studies have used terms such as pain, recurrent pain or somatic complaints.

Author's response
Before investigation, the difference between chronic pain and acute pain of the four parts were well explained to all participations. Briefly, pains with no acute physical impacts are those concerned. Precisely, “lasting over 6 hours single a time or short time with high frequency over 2-3 one day, and this bad situation happened at least 3 times in 3 months” is the standard, and if he/she had the pain like this, he/she is the person we are interested in. However any kinds of pain without particular reason like injure or certain diseases are positive in this survey. We have told the participants about this and made sure that they had understood the target and purpose of this survey, before we handed out these questionnaires. And in the questionnaire, simply we described the standard as "in the last 3 months, how often did you feel pain in neck/shoulder, low back, head and abdomen."

Thank you for your advice and we have added this section into the “Methods”.

2. The manuscript claims that chronic pain in adolescents is especially common in China and perhaps due to excessive school demands. This is interesting and may very well be true. In the Discussion, first paragraph, it
is stated that “The survey results showed that the incidence rates of headache, abdominal pain, NSP, and LBP were 30.3%, 20.9%, 32.8%, and 41.1%, respectively, which were significantly higher than the results of international research surveys”. Two references are given (conducted on Flemish and Dutch adolescents respectively) but the measures used in these are not discussed in terms of comparability and no specific information is given. The percentages found in China are indeed high but so are they in many Western countries. This can be seen in, for example, data from the Health Behaviour in School-aged Children study (HBSC) conducted in over 40 countries, including questions on headache, abdominal pains and back pain. A related issue is constituted by the fact that the percentages for pain are highly dependent on definitions. In many studies using HBSC data the limit for somatic complaints has been set at several times a week, instead of once a week, which heavily reduces the prevalence. A more nuanced and precise discussion concerning the prevalence of pain in Chinese adolescents, compared to the situation in other countries, would add to the discussion in the ms.

**Author’s Response:**

Frankly, there are many methods to identify chronic pain, before investigation, we even worried about how to define “pain”——it can be mild as just feeling uncomfortable or even sharp like a knife. So we take the subjective feelings as our priority rather than the exact definition. That is also the reason why we use frequency rather than simply “yes or no” as the answers.

Actually, we do not care about how pain it really was and what definition of pain in different institutions, it’s the current situation in China and the relationship between different pains (or just not feeling well) and some potential risk factors that our study are actually interested in.

With the compare, we know the problem in Chinese adolescents is very serious, and the compare surely can draw more concerns in China. Although with different definitions and rules, there may be no comparability between China and the West about this problem, we still think that there must be some similarity in the potential risk factors both at home and abroad. The information will be added in evaluation part. We have modified it with grateful thanks.

3. Study design and treatment of independent variables

The study design is on the one hand straightforward but nevertheless difficult to follow due to inconsistencies. In Table 1 the prevalence rates for males and females and the differences by gender (odds ratios) are presented. The subsequent analyses focus on the association between “Burden of learning” and pain. Table 2 presents a list of eight so called “Direct Indicators of burden of learning” which than are included in regression models in Table 4 analyzing each indicators association with the four pains separately. However, the variables presented in Table 2 are not the same as in Table 4. Table 4
includes four of the eight variables in Table 2 (probably due to lack of significant associations), together with two completely new variables (not earlier introduced). The labelling of indicators differ between tables, and it is not always clear what the variables stand for neither in Table 2 nor Table 4 (e.g. “Live up to the expectations of my parents” can mean that the student want to live up to expectations, actually does live up to expectations or believe that it is important generally to live up to expectations). In the same way the so-called “Indirect indicators of burden of learning” are presented in Table 3 and further analyzed in Table 5. In Table 3 two unexpected variables are shown (e.g. can smell smoke; drink alcohol), and Table 5 only uses one of the nine variables from Table 3 together with a new one. The new one is “Do you often play a musical instrument, such as piano or violin?” which might add to the burden but may also in theory be stress-relieving. Among the variables in Table 3, presenting the indirect indicators, four variables deal with eyesight such as wearing glasses. This is based on a belief that hard-working students might get impaired vision but no reference supporting such a claim is presented in the ms. If this claim is not well-founded, and since no associations with pain were found, I suggest that these variables can be omitted from the ms.

Furthermore, the multivariate analyses control for family history of chronic pain and earlier studies showing the heredity of chronic pain need to be referred to.

In sum, I think the ms would be improved by focusing on a smaller number of well-defined and carefully chosen variables, that do not overlap, and that these variables are used and presented in all relevant tables throughout the ms.

Author’s response:

We have given a clear definition about the direct and indirect indicators of learning in the “Methods”. Briefly, the direct indicators refer to the objective burden and subjective feeling of school work, and the indirect indicators are mainly about the living habits. We have deleted some iterative indicators and selected the variables which can actually reflect the learning burden with grateful thanks.

There are still some questions to explain.

Indeed there are no direct results showing the relevance between wearing glasses and learning burden, neither did other literatures as we referred to. But we still strongly believe there may be connections between them because of the huge percentage of teenagers wearing glasses in China. Our theory is as the burden accumulate when most students have to spend more time in school work, the connection shall be fixed, along with the accumulation when most teenagers have to wearing glasses, the connection fades away. That is the situation in China and that’s still a speculation. So we still put it in “indirect indicators”. There are some differences between Table 2 and 4, Table 3 and 5 due to some indicators lacking of significant associations.

Using multiply logistic analysis the more relevant factors considered, the clearer principle factors exists. We considered any positive factor as well as
those not significant but should be, such as gender and grades, for the purpose to achieve more convincible results.

To expose risk factors and the special situation in China rather than mechanism research, we didn’t choose to narrow factors this time. A further program for carefully selected factors with more detailed questionnaires need to be processed, fortunately which is undergoing now.

4. Minor essential revisions

Methods: It would aid the understanding if the Methods section included information not only on grades but on ages (due to differences in educational systems between countries), and if all information related to the sample and non-response were moved here (i.e. the two first sentences, and the second paragraph, under ‘Results and analysis’). Regarding the sample, of the original 3000 questionnaires 2849 were successfully retrieved, and the reasons for uncompleted questionnaires are thoroughly presented. However, the analytical sample is 2587 and the reasons behind this larger reduction is not clearly stated (the response rate is still high though, 86.2%). Furthermore, the methods section lacks a more thorough account of the dependent variables.

Authors’ response:

Gratefully accept the revision suggestion. “In this study, a total of 3000 questionnaires were handed out, of which 2849 questionnaires (95%) were successfully retrieved and 2587 questionnaires (86.2%) were valid (if there are more than 15% of the answers which cannot reflect the participant’s purpose about this questionnaire, then we regard this kind of questionnaires we have collected as invalid ones). Among the 152 uncompleted questionnaires, 5 questionnaires were excluded due to lack of response to key questions, and 1 questionnaire could not be completed because the selected student was on sick leave. Analysis of the remaining 147 uncompleted questionnaires showed that the results regarding the incidence rates of the four types of chronic pain were not statistically significantly different from the results of the 2849 completed questionnaires.” We have added this section into the “Methods”.

Results: When presenting the results in the text, concerning differences between groups, it is preferable to refer to the odds ratios instead of referring to the percentages in a specific group (since the latter means that the reader must keep the other percentages, in the comparison group, in mind).

Author’s response:

Gratefully accept the revision suggestion. Briefly, we use percentage to give the readers an intuitionistic expression about the prevalence of four different chronic pains and its relevance with potential risk factors, and we use OR, which is mostly represented in the tables, to conduct a compare
The role of sleep: Sleep is used as an independent variable. However, sleep problems and somatic complaints may co-occur for a number of reasons. For example, pressure and stress may affect both sleep and somatic complaints, and somatic complaints may per se affect sleep (such as back pain). This also means that adjustment for sleep in the models may bring 'over control'. This need to be discussed in the ms.

**Author’s response:**
Gratefully accept the revision suggestion, and these explanations has been added to the manuscript.

The term 'incidence' is used throughout the manuscript. However, considering that all data is collected at one point in time, the correct term is 'prevalence'.

**Author’s response:**
Gratefully accept the revision suggestion.

5. Discretionary revisions

The references do not appear in numerical order.

**Author’s response:**
Gratefully accept the revision suggestion.

The introduction, paragraph 1: It can be noticed that the argumentation for the study area deals more with pain in adults than in adolescents

**Author’s response:**
The lack of the statistics about the economic loss caused by adolescent’s chronic pains makes us to substitute it by that of adults. And we believe that it can also represent the severity of chronic pains and the urgency of this study.

Results, paragraph 4: Referring to Table 3, problems with insomnia etc is stated to be 54.5% but that is not the estimate presented in the table

**Author’s response:**
Gratefully accept the revision suggestion, and the alternation has been added to the Table 3.

Results, paragraph 6: Referring to the results in Table 5, it is said that the prevalence of 38.6% and 27.5% were significant but it is the next group (‘after 1:00’) that shows significant results
Author’s response:
Gratefully accept the revision suggestion.

Results, paragraph 3: ‘enormous pressure’ should read ‘much pressure’ since that is what is asked for

Author’s response:
Gratefully accept the revision suggestion.

Table 2: <10h should be >10h

Author’s response:
Gratefully accept the revision suggestion.

Tables: The table (no 1, 4 and 5) give a messy impression. Fewer decimals (one decimal for percentages and two for OR) would help together with not using an own column to display the general p-value.

Author’s response:
Gratefully accept the revision suggestion.

Discussion, para 1: It is stated that “multivariate analysis indicated no significant correlation between grade and chronic pain, which is most likely due to the heavy learning burden generally experienced by the students in all grade levels”. Is it not possible that the reason is that an unequal burden of school pressure between grades is controlled for in the model?

Author’s response:
During the survey, we used a random selection method based on the students’ identification numbers to complete the survey questionnaire. But due to the unique academic circumstances of the twelfth grade year, only a small portion of the students completed the questionnaire, which we have put this limitation into “Methods”. It may make a small impact on the multivariate analysis, and we will added the explanation into the “Discussion”.

Discussion, para 2: It is stated that “the incidence of chronic headache was closely related to the average daily study time…” I find this association weak and unclear.

Author’s response:
Thanks for your suggestion. According to the statistics, we speculate that only if the students have an average study time more than 10 hours that the difference becomes significant, and we'll add it into the “Discussion”. But we
still believe its value because in China, almost every student has such a long study period.

Discussion, para 4 and 6; Conclusion, para 1: The findings are mentioned in terms of bidirectional effects and mutual effects. Perhaps a more careful wording van be used considering that this is a cross-sectional study.

Author’s response:
Gratefully accept the revision suggestion.

Discussion: The gender differences are discussed. It can be noted that this study could easily include an analysis of gender differences and to what degree they can be explained by school pressure.

Author’s response:
Thank you for your suggestion. The relation between gender difference and school pressure may include (1) psychological bearing capability; (2) physiological factors; (3) living habits; (4) family’s expectation. But in this study we just focus on the relevance between learning burden and chronic pain so we do not have enough evidence to reveal the link between gender difference and school pressure and we can also put this section into the essay. Maybe we can conduct a further investigation about this problem.

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests

Comment Two

Reviewer's report
Title: A correlation study between the incidence of chronic pain and academic pressure in adolescents in China (Shanghai)
Version: 2 Date: 3 March 2015
Reviewer: Ellen Aartun
Reviewer's report:
I want to congratulate the authors with a well conducted study. The study is based on a population with almost 3,000 adolescents and the study was aimed to investigate the incidence of chronic pain, current academic pressure and the
relationship between these factors. There is a lack of knowledge at this field, so the study topic is highly relevant. However, the study has some major limitations that are necessary to improve before the manuscript is published.

Major Compulsory Revisions

1. There is a problem with the use of the term “incidence”. Incidence is defined as the number of new cases of a disease in a specified population during a given period of time. That means that the authors should have had a population free of chronic pain at baseline and then investigated the number of new cases who developed chronic pain over a period of time, i.e., the study needs to be longitudinal. In the method section it becomes clear that the design of the study is cross-sectional and therefore, the conclusion that has been drawn in this study is not supported by the data. I interpret the pain that is measured in this study to be either a prevalence proportion or a measure of frequency of pain and not an incidence rate. The term “incidence” should be reworded in the manuscript.

Author’s response:
Gratefully accept the revision suggestion.

2. There might be a problem using the term “chronic pain” in this study. The response options “almost never”, “occasionally”, “often” and “always” are reflecting the frequency of pain and not the duration of pain, see line 166-169. In addition, the authors describe that the pain had to last for more than 10 minutes. Since a usual cut-point for chronic pain is three months, the authors should clearly describe the pain questions. In the current version of the manuscript, the conclusions are not supported of the data and the authors should remove the term “chronic” in the manuscript.

Author’s response
Before investigation, the difference between chronic pain and acute pain of the four parts were well explained to all participations. Briefly, pains with no acute physical impacts are those concerned. Precisely, “lasting over 6 hours single a time or short time with high frequency over 2-3 one day, and this bad situation happened at least 3 times in 3 months” shall be the standard, and if he/she had the pain like this, he/she is the person we are interested in. We have told the participants about this and made sure that they had understood the target and purpose of this survey, before we handed out these questionnaires. And in the questionnaire, simply we described the standard as ”in the last 3 months, how often did you feel pain in neck/shoulder, low back, head and abdomen”, and we use frequency rather than simply “yes or no” as answers. Then the onset frequency of pain was classified into the following four levels: “almost never”, less than once per month; “occasionally”, 1-3 times per month; “often”, 1-3 times per week; and “always”, more than 3 times per week. General treatment of the results: “often” and "always" were
treated as "yes", while the other two levels, "almost never" and "occasionally", were treated as “No”. In this way, we’re sure that the participants can represent this real purpose, and we have conducted a pre-survey to confirm it before the survey began.

3. How can the authors be sure that “the direct and indirect indicators” are risk factors or “candidate risk factors”? The conducted study is a cross-sectional study and therefore, it is misleading to conclude that the factors are risk factors, but it is possible to conclude that the factors are associated with the outcome. For example, there has been shown a bidirectional association between sleep difficulties and back pain in a previous study, so the authors cannot assume that the associated factor is a risk factor. Please reword “risk factors”.

Author’s response:
Gratefully accept the revision suggestion, and these explanations has been added to the manuscript.

4. In the analysis, a multivariate logistic regression model was performed. The model included all risk factors. Some of these factors are describing similar issues that could be closely correlated with each other such as “average daily sitting time” and “sitting time after school” or “how long the adolescent had suffered from nearsightedness” and “when nearsightedness started”. If all factors have been included in the study, there might be a multicollinearity issue in the models. The authors should provide whether or not they have checked for multicollinearity.

Authors’ response:
In the process of questionnaire designing, principal component factor analysis was used to avoid factor repetition. Which were described in Methods. The final Kaiser-Mayer-Olkin (KMO) index of the questionnaire was 0.593, which means that the questionnaire isn’t suitable for another principal components factor analysis. Though some questions seems to reflect the same aspect, there are differences underlying. Surely we cannot totally avoid the interference of multicollinearity, but we did weaken its possible influence. We even compared the response structure of similar questions, which had a huge difference in distribution. Thanks for your advice, and we have added this section into the “Methods”.

5. It is not clear how the authors have performed the analysis. In the last paragraph in the method section they write that the model “included all the risk factors”, but in the presentation of the results they are dividing the results into direct and indirect indicators. In addition, the authors have presented some variables in the method section, but these variables are
not presented in the result section (table 4 and table 5). Does it mean that the variables described in the method section are not statistically significant? How many other variables have the authors included in the models and not described in the method section? This is of high importance for the understanding of the models. An example of this confusing set of variables becomes clear in table 5 with the question “Do you often play a musical instrument…” which is a question the authors have not described in the method section, table 2 or table 3. Another example is the question “average daily sitting time” which is described in the methods, but not presented in any table. Please clarify the variables that were included in the models.

Author’s response:
Gratefully accept the revision suggestion, and after single logistic analysis, we have updated the candidate risk factors, which are in the “Methods”. There are 7 direct indicators and 6 of them proves to be relevant with the different chronic pains; and there are 9 indirect indicators but only 2 of them proves to be significant about the difference. Besides, gender and grades were controlled staying in the model for multivariate logistic regression analysis. All the indicators with significance are shown on the tables, and the ones which don’t show on the tables are not significant in any of the four pains.

6. In the discussion, limitations of the study are not clearly stated or more correctly written, the limitations are not stated at all. Please describe the limitations of this study.

Author’s response:
Gratefully accept the revision suggestion, and the section of “Evaluation” has been put behind the “Discussion”.

7. In the discussion at line 311, it is not clear what “this study” refers to. The authors are writing that “this study demonstrated bidirectional effects between NSP and sleeping”, but the study design of the current study is cross-sectional and the authors do not have data to support this statement.

Author’s response:
Gratefully accept the revision suggestion.

Minor Essential Revisions
1. Please use the reference style for BMC Musculoskeletal Disorders.

Author’s response:
Gratefully accept the revision suggestion.
2. The title of the subhead “Results and analysis” should be changed to “Results”. The analysis has been described in the method section.

**Author’s response:**
Gratefully accept the revision suggestion.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

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

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