PEER REVIEW HISTORY

BMJ Paediatrics Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

This paper was submitted to a another journal from BMJ but declined for publication following peer review. The authors addressed the reviewers' comments and submitted the revised paper to BMJ Paediatrics Open. The paper was subsequently accepted for publication at BMJ Paediatrics Open.

ARTICLE DETAILS

TITLE (PROVISIONAL)	The effect of socioeconomic conditions on frequent complaints of pain in children: findings from the UK Millennium Cohort Study
AUTHORS	Fryer, Benjamin; Cleary, Gavin; Wickham, Sophie; Barr, Benjamin; Taylor-Robinson, David

VERSION 1 - REVIEW

REVIEWER	Tighe, Mark
REVIEW RETURNED	31-Jan-2017

GENERAL COMMENTS	The team have tried to take on a common and important question, for which they should be encouraged, and they develop some useful and important messages, which do come through clearly. I assume there'll be a statistics review and won't dwell in detail on this aspect. The focus on mitigating factors is also a useful message. Major issues: The authors need to be clearer on their definitions: what is 'Frequent complaints of pain'? There are some internationally agreed consensus definitions on functional abdominal pain. The text often conflates persistent pain with frequent complaints, and the questionnaires should have made it clear what they mean by often and I'm worried about composite questions (e.g. does child often complain of headache/abdo pain or headaches. Include a table detailing and commenting on the missing data. Significant evidence points to a cohort of children with recurrent pain related to maternal anxiety, and it would be worth dissecting out the maternal mental health diagnoses further. The other issue is the impact on functioning: are the children still able to get to school or participating in clubs. There is good evidence to show the pain scores between children who present and children in the playground may well be similar; but it's the impact on the family functioning that leads to presentation and referral. Minor issues: the authors call for 'The elimination of child poverty would represent substantial progress towards this aim'. Entirely agree in principle but the study didn't assess income: but used maternal education as a surrogate.

REVIEWER	Reviewer 2
REVIEW RETURNED	27-Feb-2017

GENERAL COMMENTS	This is a thorough, considered analysis examining an under-

researched area of children's health in a large contemporary UK cohort. It will be of high interest to ADC readers and I have only small number of minor changes to suggest, as outlined below.

Introduction:
• This seemed a little brief. If word count allows, some additional discussion around the mechanisms through which the mediating variables of interest may affect pain would be informative.

Analysis:
• Inequalities in the outcome (pain) are measured using odds ratios. The authors acknowledge the limitations of using ORs when the outcome is common (such as here) and state that analyses were repeated using Poisson regression to estimate risk ratios. Given this, it would be preferable if RRs were presented in the paper instead.

Sensitivity analyses:
• The authors are to be commended for the series of sensitivity analyses they carried out to address possible limitations in the data and / or analytic design. Some of these are first mentioned in the results or discussion (for example the analysis addressing the potential collinearity between the mediator (SDQ) and the outcome (one item from the SDQ); discussion around the outcome measure [which captures sickness as well as pain]). Mentioning these sensitivity analyses / considerations in the methods section would put the readers mind at rest earlier on.

Sample / variable description:
• If word count allows, it would be useful to have a more detailed description of the exposure (education) variable in the methods (i.e. its categories, and any exclusions).
• Please list item missingness for each variable somewhere (e.g. under Table 1?).
• %(N) with the outcome for each variable of interest would be useful information to have in the main results tables (ORs).
• Please also provide more detail on how the final sample was arrived at (I think the missing link is how many children were present at the 5th sweep?).

Discussion:
• The limitations of the outcome variable are well addressed and the authors repeat the analyses using alternative exposure variables (social class etc.). Some more attention might be paid to the limitations of the mediators variables – the measure of fruit consumption as a proxy for 'diet' is one that springs to mind.

What this study adds: the term 'disadvantaged conditions' seemed a bit dramatic for referring to low maternal education - perhaps 'less advantaged families' would be more appropriate?

VERSION 1 – AUTHOR RESPONSE

Comments to the Authors	Authors' response
Reviewer: 1	
The team have tried to take on a common and important question, for which they should be encouraged, and they develop some useful and important messages, which do come through clearly. I assume there'll be a statistics review	Thanks

Comments to the Authors	Authors' response
and won't dwell in detail on this aspect. The focus on mitigating factors is also a useful message.	
Major issues: The authors need to be clearer on their definitions: what is 'Frequent complaints of pain'? There are some internationally agreed consensus definitions on functional abdominal pain. The text often conflates persistent pain with frequent complaints, and the questionnaires should have made it clear what they mean by often and I'm worried about composite questions (e.g. does child often complain of headache/abdo pain or headaches.	Thanks. We are limited to analyzing the data as already collected in the nationally representative Millennium Cohort Study, using a question from a validated survey (the Strengths and Difficulties questionnaire). As suggested, we have made reference to the international "Rome" consensus definitions in the introductory section of our revised main document, and also added more detail about the question and its limitations.
Include a table detailing and commenting on the missing data.	Thanks. This is a good suggestion and we have added a table to the supplementary data file which is referenced in our revised main document.
Significant evidence points to a cohort of children with recurrent pain related to maternal anxiety, and it would be worth dissecting out the maternal mental health diagnoses further. The other issue is the impact on functioning: are the children still able to get to school or participating in clubs. There is good evidence to show the pain scores between children who present and children in the playground may well be similar; but it's the impact on the family functioning that leads to presentation and referral.	Thanks – we have undertaken our primary analysis using the Kessler scale as a measure of maternal mental health due to concern that mental health diagnoses may be under-reported in the MCS. An analysis of the potential differential consequences of pain in children on school functioning by socioeconomic conditions is in the pipeline, but this is a very different analysis (with school outcomes as the main outcome, and pain as the exposure) and is beyond the scope of this paper.
Minor issues: the authors call for 'The elimination of child poverty would represent substantial progress towards this aim'. Entirely agree in principle but the study didn't assess income: but used maternal education as a surrogate.	Thanks. We have removed this statement from our revised main document.
Reviewer: 2	
This is a thorough, considered analysis examining an under-researched area of children's health in a large contemporary UK cohort. It will be of high interest to ADC readers and I have only small number of minor changes to suggest, as outlined below.	Thanks
Introduction: This seemed a little brief. If word count allows, some additional discussion around the mechanisms through which the mediating variables of interest may affect pain would be informative.	Thanks. This discussion has been extended to the extent permitted by the word count
Analysis: Inequalities in the outcome (pain) are measured using odds ratios. The authors acknowledge the limitations of using ORs when the outcome is common (such as here) and state that analyses were repeated using Poisson regression to estimate risk ratios. Given this, it would be preferable if RRs were presented in the paper instead.	Thanks. The main document has been revised to include estimated Risk Ratios derived from Poisson regression throughout, including all relevant tables and figures in the main document and supplementary document.
Sensitivity analyses: The authors are to be commended for the series of sensitivity analyses they carried out to address possible limitations in the data and / or analytic design. Some of these are first mentioned in the results or discussion	Thanks. This mention has been added in the methods section of the revised main document

Comments to the Authors	Authors' response
(for example the analysis addressing the potential collinearity between the mediator (SDQ) and the outcome (one item from the SDQ); discussion around the outcome measure [which captures sickness as well as pain]). Mentioning these sensitivity analyses / considerations in the methods section would put the readers mind at rest earlier on.	
Sample / variable description: • If word count allows, it would be useful to have a more detailed description of the exposure (education) variable in the methods (i.e. its categories, and any exclusions).	Thanks. This has been added to the methods section of the revised main document
• Please list item missingness for each variable somewhere (e.g. under Table 1?).	Thanks. This detail has been provided in the supplementary file, and referenced in the revised main document
• %(N) with the outcome for each variable of interest would be useful information to have in the main results tables (ORs).	Thanks. This has been added to relevant tables in the revised main document
• Please also provide more detail on how the final sample was arrived at (I think the missing link is how many children were present at the 5th sweep?).	Thanks. This detail has been provided in the supplementary file, and referenced in the revised main document
Discussion: • The limitations of the outcome variable are well addressed and the authors repeat the analyses using alternative exposure variables (social class etc.). Some more attention might be paid to the limitations of the mediators variables – the measure of fruit consumption as a proxy for 'diet' is one that springs to mind.	Thanks. The discussion text has been amended to reflect these limitations
What this study adds: the term 'disadvantaged conditions' seemed a bit dramatic for referring to low maternal education - perhaps 'less advantaged families' would be more appropriate?	Thanks. Text revised as suggested