



STUDY PROTOCOL

REVISED

A systematic review protocol of quantitative instruments of income inequality in studies of children and adolescents [version 2; peer review: 2 approved]

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Abstract

Background: Income inequality is an important indicator of socioeconomic position which is a determinant of social, psychological, and physical health outcomes from childhood to adulthood. Different income inequality instruments (metrics) are used to investigate associations between income inequality and health outcomes (e.g. Gini coefficient). Income inequality instruments provide unique information on the construct of socioeconomic inequality. Albeit there is variation in studies as to the type and rationale for using a particular quantitative instrument of income inequality. The aim of this systematic review will be to investigate and identify the most used quantitative income inequality instrument in studies of children and adolescents up to 18 years of age.

Methods: The PRISMA-P framework will be applied to identify high quality articles (PROSPERO: CRD42021259114). A search will be conducted in PubMed, Embase, and PsycINFO. The search will include studies concerned with income inequality and/or socioeconomic inequality in children and adolescents. All articles will be independently reviewed, data extracted, and quality appraised by two reviewers and a third to arbitrate disputes. Articles will be reviewed by title and abstract using inclusion criteria. A data extraction form will be used. Three questions will assess the quality of the rationale for using a particular income inequality instrument and the Newcastle-Ottawa Scale will be used to assess bias and quality. The primary outcome of interest is the type and frequency of quantitative income inequality instruments used and the study outcome associated with that income inequality instrument.

Conclusions: This systematic review will aim to provide a summary of the different types of quantitative income inequality instruments used in studies of child and adolescent populations. This will help to guide researchers and policy makers on the use of income inequality metrics

Open Peer Review

Approval Status

	1	2
version 2 (revision) 14 Jun 2022		 view
version 1 24 Dec 2021	 view	 view

1. **Richard M. Duffy** , Rotunda Hospital, Dublin, Ireland
2. **Emily Lowthian** , Swansea University Medical School, Swansea, UK

Any reports and responses or comments on the article can be found at the end of the article.

in future studies aimed at understanding associations with health and social outcomes in children and adolescents.

Keywords

Income inequality, child health, poverty

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Author roles: **O Driscoll D:** Conceptualization, Formal Analysis, Investigation, Methodology, Project Administration, Validation, Writing – Original Draft Preparation; **Kiely E:** Conceptualization, Investigation, Methodology, Project Administration, Supervision, Visualization, Writing – Review & Editing; **O Keeffe L:** Conceptualization, Investigation, Methodology, Project Administration, Supervision, Visualization, Writing – Review & Editing; **Khashan A:** Conceptualization, Investigation, Methodology, Project Administration, Supervision, Visualization, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

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REVISED Amendments from Version 1

We improved the first draft of this protocol after receiving the insightful feedback by two reviewers. We edited the phrasing of the aims for clarity. We edited the introduction to improve our contextualising of income inequality, that there are many income data sources, that there are many variations of income (e.g. household), and we included a definition of lower, middle, and high income countries. We updated the inclusion and exclusion criteria for clarity that this piece of work focuses on less than 18 years of age only and study designs excluded e.g. ecological studies. We updated the data extraction to explain the level of data collection. We updated the limitations section that excluded certain literature types and that we did not study socioeconomic status (SES), nor socioeconomic position (SEP). We used the term socioeconomic for consistency throughout the protocol paper.

Any further responses from the reviewers can be found at the end of the article

Introduction and background

Income inequality demonstrates continual income gap between households that are either predisposed to or result in further social deprivation, evolving mental disorders, social injustice, poor education, poor employment attainment and lower life expectancy (Buttrick *et al.*, 2017; Chen *et al.*, 2007; Coburn, 2000; Kawachi & Kennedy, 1997; Lillard *et al.*, 2015; Lynch *et al.*, 2000). Public and social policies (e.g. taxes, welfare benefits) may influence actual income level, perceived income level within a neighbourhood or effective income level on quality of life (Kawachi & Kennedy, 1997; Kondo *et al.*, 2009; Morrissey *et al.*, 2020). Furthermore, addressing income inequality may benefit child and adolescent outcomes (Engle *et al.*, 2011). Income inequality influences the mortality and health outcomes of children and their trajectories (longstanding illnesses, psychosocial wellbeing and obesity) into adolescence and adulthood (Vallejo-Torres *et al.*, 2014). The effect of income inequality on child health outcomes differs throughout the life course, e.g. study findings differ as to the effect of income inequality on mortality based on age (Lynch *et al.*, 2001; McIsaac & Wilkinson, 1997). Higher per person family income is associated with better outcomes in relation to physical activity, psychological symptoms and overall life satisfaction in adolescents. (Elgar *et al.*, 2015). Moreover, there is evidence that those individuals in a higher income bracket are healthier and that addressing income inequality by raising the incomes of the poorest can improve health outcomes and health inequalities (Lynch *et al.*, 2004)

Measuring inequality is a subject where a significant proportion of time is spent on conceptualizing inequality and the meaning of terms. The development of inequality within a region or the efficacy of a certain social reform can be documented differently depending on the instrument used to measure inequality (De Maio, 2007). Therefore, due consideration must be given by researchers and policy-makers as to the metric of income inequality being utilised, in order to make accurate and well-informed associations with health outcomes. This includes the variables needed to calculate the income inequality instrument. Income inequality instruments (i.e. quantitative metrics of income inequality) include the Lorenz curve, the Gini

coefficient, decile ratios, the Palma ratio, the Theil Index and others (Trapeznikova, 2019). Each instrument provides insight into different aspects of income inequality. A policy-maker interested in the effect of a policy on the most socioeconomically deprived in a society may use the Palma ratio as an alternative to the Gini coefficient as their inequality instrument and concentrate on consumption instead of income data (De Maio, 2007; Kawachi & Kennedy, 1999; Swigost, 2017). Moreover, inequality instruments across countries may vary, and differences exist in data sources and definitions (e.g. New-world bank classification of lower-middle, upper-middle, and high income) (World Bank Country and Lending Groups, 2021). For example, measures of income inequality (e.g. data on income) are usually collected from household surveys and as such may not suit studying inequality at the top end of the income distribution as high-income respondents may be less likely to disclose all their wealth. In studies that focus on child outcome, each income inequality instrument provides additional information on the construct of socioeconomic inequality being investigated in relation to the measured child and adolescent outcome. The income data source used in child and adolescent studies is often at the household/family income level rather than individual level (Choi *et al.*, 2017). Martikainen *et al.*, demonstrates that caution must be used in making associations between income types (e.g. household, individual, disposable) in mortality research and there is a need to better understand the role of individual income, household income and disposable income in understanding the association of income inequality and childhood outcomes (Martikainen *et al.*, 2009). Moreover, income inequality instruments are not identical. A preliminary search of PubMed and Embase database did not yield any systematic reviews investigating the frequency of quantitative income inequality instruments used in outcome studies. Moreover, this illustrates that this review will be the first to report the frequency of use of each quantitative income inequality instrument in studies of children and adolescents.

The objectives of this systematic review protocol are to (a) determine the frequency of use of each quantitative (objective) income inequality instrument within studies investigating child and adolescent outcomes, (b) to ascertain if the frequency of quantitative income inequality instruments varies depending on characteristics (e.g. country, health outcome etc), (c) to determine the difference wealth sources (e.g. survey data, taxation data) used to calculate each income inequality instrument, (d) to discuss possible advantages and disadvantages of each income inequality instrument.

Why perform this systematic review?

- The types of quantitative instrument of income inequality used in studies among children and adolescents is not well quantified.
- There is no consensus as to the most appropriate quantitative instrument of income inequality that should be used in studies among children and adolescents.
- The advantages and disadvantages of each method of defining and assessing quantitative income inequality instruments in studies of children and adolescents are not well understood.

Methods

Searches

The systematic review protocol is registered in the International Prospective Register of Systematic Reviews (PROSPERO) (ID: CRD42021259114 on 10/10/21). The following databases will be included in the search process: PubMed, Embase, and PsycINFO from 2010 up till January 2021. This is to capture countries of varying economic levels. The following key terms will be used in the search: “child/ren” or “adolescent/s” and “socioeconomic” or “poverty” or “social inequality” or “income”. (Figure 1) A sample search strategy is available (see extended data).

Types of study to be included

Inclusion criteria: quantitative study designs (cross-sectional, case-control, prospective, longitudinal, ecological) focusing

on income inequality as the primary (main) study question in children and adolescents will be included (i.e. less than 18 years of age only). Articles published in the English language will be included and if published in any other language will be translated. Only published studies in peer-reviewed journals will be included.

Exclusion criteria: The following study designs (qualitative, case studies, randomised control trials, reviews, discussions, ecological and commentaries) will be excluded as our interest is in the use of income measures in studies of child health outcomes. Grey literature and conference abstracts will be excluded. (Table 1)

Condition or domain being studied:

Instruments of quantitative income inequality, children and adolescents.

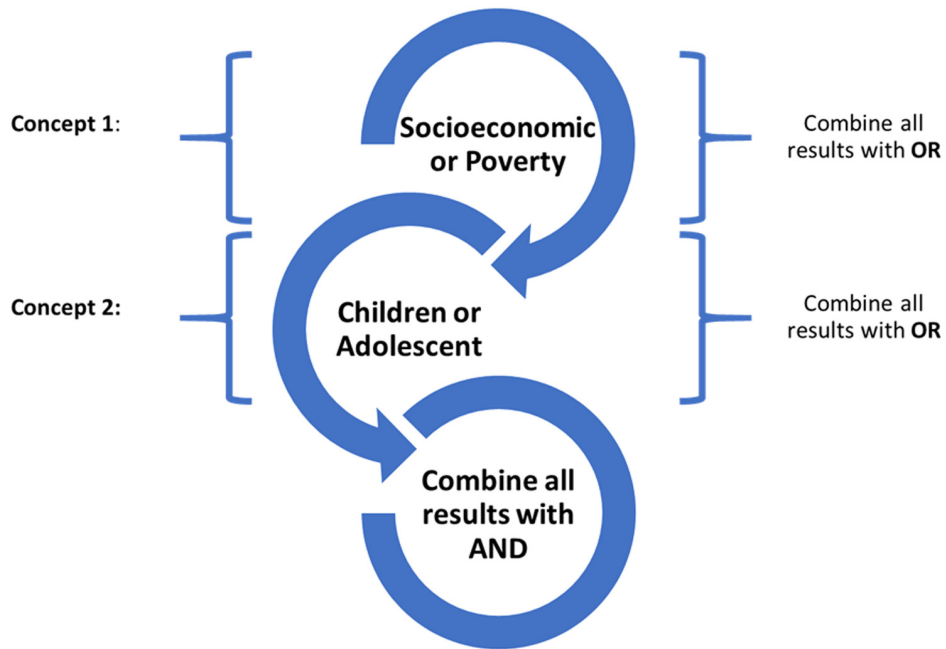


Figure 1. Search strategy.

Table 1. Inclusion and exclusion criteria.

	Included	Excluded
1	Quantitative study designs in peer-reviewed journals (prospective, longitudinal, cohort, case control, cross-sectional, ecological).	Studies not published in peer-reviewed journals. Qualitative, case studies, randomized control trials, quasi experimental reviews, grey literature, conference abstracts, discussions, and commentaries.
2	Studies focusing on income inequality as the primary (main) study question.	Studies that only focus on income inequality as a secondary study question/outcome.
3	Child and adolescent population (<18 years of age).	Adult population (>18 years of age).
4	Articles in all languages.	Qualitative (subjective) measures of income inequality.

Participants/population:

Participants will be children and adolescents (aged 0–18 years of age).

Exposure(s):

Any exposure in a study that included the use of an instrument of quantitative income inequality.

Comparator(s)/control:

No comparator.

Main outcome (s):

Type of income inequality instrument used.

Type of primary outcome (health outcome) associated with income inequality instrument.

Additional outcome (s): Not applicable.

Data management

Selected articles will be stored and managed using Mendeley 1.19 Reference Manager Library. This will be used to facilitate sharing and collaboration between reviewers during the screening of abstracts and titles, data extraction and quality appraisal stages.

Data extraction (selection and coding)

The following procedure will be used for data selection and data extraction. The titles and abstracts will be screened by at least two reviewers independently. A third reviewer will arbitrate if there are disagreements between the two reviewers. Abstracts that do not fulfil the inclusion criteria will be excluded. The abstract must contain and demonstrate that income inequality is a primary exposure of the study within the article. If there is uncertainty in terms of inclusion criteria, the article will be retained for the next stage of screening. Subsequently, full-text articles will be screened to ensure adherence to inclusion and exclusion criteria. This will be conducted by two independent reviewers. A third reviewer will arbitrate if there are disagreements between the two reviewers. Data extraction of selected studies will be done independently by two reviewers. Data extraction will include first author name, final author name, year of publication, journal name, origin of study location, study location (i.e. low, medium, high income), study setting (including if the instrument reflects national, regional or local level data), income inequality instrument(s), aim of study, sample population, age of population, sample size, frequency of income inequality measurement (e.g. one recording of salary or multiple recordings of salary), data collection method, analytical approach, statistical test, study design, primary outcome measured, and type of association reported (Table 2). The primary outcome measured will be coded based on health outcome. A third reviewer will ensure accuracy of data extraction. References of included articles will be checked for any other potential eligible studies. The extracted data will be populated, categorised and stored in Microsoft Excel. A data abstraction form will be used (Table 2). To improve the reliability of data abstraction by the reviewers, a pilot test will be performed of the data abstraction form on a small, random sample and if needed the form will be adjusted.

Table 2. Data Extraction Form.

First author name, final author name	
Publication type	
Year of publication	
Journal name	
Full reference	
Origin of study location	
Category of study location	
Study setting	
Income inequality instrument (1)	
Income inequality instrument (2)	
Aim of study	
Data source (e.g. survey)	
Sample population	
Age of population	
Sample size	
Frequency of income measurement	
Data collection method	
Analytical approach	
Statistical test	
Primary outcome measured	
Type of association reported	
Comments	

Quality assessment

This review will apply the following critical appraisal tools based on study design (e.g. longitudinal) to assess the methodological quality of selected studies using the Newcastle-Ottawa Scale (Stang, 2010). This systematic review will identify the frequency and type of income inequality instruments used. As such, the quality of the study is important, albeit the focus of quality assessment will be on whether a study explained the rationale for using a particular income inequality instrument. Moreover, three additional questions will be asked: (1) Does the study clearly state the income inequality instrument used? (2) Does the study explain the rationale for using that income inequality instrument? (3) Does the study explain how the income/consumption data was collected (e.g. survey, administrative data /taxation records) for that income inequality instrument? (Table 3) This may facilitate further ability to categorise a studies explanation for using a particular income inequality instrument. Two reviewers will independently appraise the quality of the selected studies. Any discrepancies between reviewers will be discussed and resolved. A third reviewer will arbitrate if no consensus achieved. The consistency of the appraisal tool (Newcastle-Ottawa Scale) will be determined

Table 3. Three questions to appraise the quality of rationale for using income inequality instrument.

Did the study:		
1	Clearly state the income inequality instrument used?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2	Explain the rationale for using that income inequality instrument?	Yes <input type="checkbox"/> No <input type="checkbox"/>
3	Explain how the income/consumption data was collected (e.g. survey, tax)?	Yes <input type="checkbox"/> No <input type="checkbox"/>

by calculating Cohen's Kappa inter-rater reliability statistic (Cohen, 1960). Studies will not be excluded based on quality of evidence, moreover it will be reflected in the narrative synthesis.

Data synthesis

A qualitative meta-summary will be used to synthesise the descriptive findings from the quantitative studies. This is to apply a mixed research method synthesis that will aggregate and integrate the findings from the included studies.

Ethics and dissemination

This research does not require ethical approval. It is retrospective in nature and does not involve direct or indirect research with human subjects. The research findings will be disseminated at conferences and published in an open access peer reviewed journal.

Study status

At the time of publication of this protocol, database searches have been completed and study selection is underway. Completion of the review is expected by March 2022.

Strengths and limitations

To the best of the authors' knowledge, this review will be the first to systematically determine the prevalence of quantitative income inequality instruments in studies of the child and adolescent population. The methodological approach (e.g. extraction of data with a narrative synthesis) may provide a broader understanding to provide a comprehensive exploration of the topic. This exploration may highlight if researchers are using a particular income inequality instrument with specific health outcomes and if there is a rationale for same. The use of the Newcastle-Ottawa Scale in appraising the quality of the overall body of evidence will assist future readers in determining which quantitative income inequality instrument to utilise in their research when investigating outcomes in a child and adolescent population.

The authors anticipate that our research will have limitations. It is possible that relevant studies may not be found. The search time-period is limited and as such, it will not reflect the use of income inequality metrics prior to the inclusion dates. This research focuses on objective income inequality instruments, it does not include other important aspects of poverty including

socioeconomic position (SEP), other environmental factors (e.g. neighbourhood poverty) or other scales (e.g. Family Affluence Scale). Grey literature, government reports and/or conference abstracts are not included. This review will focus on studies that include income inequality as a primary exposure. Income inequality measures investigated as a secondary exposure will not be included. This is to ensure the review is practical, achievable, and relevant.

Conclusion

This protocol describes the methodological steps that will be taken in conducting a systematic review to identify and describe the quantitative instruments of income inequality. The thorough methodology to searching the literature, selecting studies, data extraction and appraisal, will better inform current and future research findings. The findings from this review will be valuable to stakeholders who are investigating or designing studies of income inequality or the effects of social inequality on child and adolescent outcomes. It may highlight additional varied instruments available to researchers and policy makers. Moreover, it may highlight the need for a cross-disciplinary discussion towards developing a standard conceptual framework for quantitative research on income inequality.

Data availability

Underlying data

No data are associated with this article.

Extended data

Open Science Framework: "A systematic review protocol of quantitative instruments of income inequality in studies of children and adolescents", <https://doi.org/10.17605/OSF.IO/ABQ39> (Driscoll (2021)).

This project contains the following extended data:

- Additional file 2 Preliminary Search Strategy.pdf

Reporting guidelines

Open Science Framework: PRISMA-P checklist for "A systematic review protocol of quantitative instruments of income inequality in studies of children and adolescents", <https://doi.org/10.17605/OSF.IO/ABQ39> (Driscoll (2021)).

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/) (CC-BY 4.0).

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[Reference Source](#)

Open Peer Review

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Reviewer Report 23 June 2022

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Emily Lowthian 

Population Data Science, Swansea University Medical School, Swansea, UK

Thank you to the authors for carefully responding to the peer reviewer comments I made. I am satisfied with the response, and I look forward to seeing the review indexed. Best of luck with the work.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Inequalities in child and adolescent health, adverse childhood experiences, parental behaviours, child wellbeing.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 10 February 2022

<https://doi.org/10.21956/hrbopenres.14664.r31347>

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Emily Lowthian 

Population Data Science, Swansea University Medical School, Swansea, UK

Overall, this protocol offers a promising and important question around income inequality

measurement and child and adolescent outcomes. Research has shown that different measures of socioeconomic status often represent differing effects of inequality, e.g. parental education may be cultural, or knowledge-based, whereas income may represent material access. The protocol is clear to a large extent, but I think more can be done to really ground why focusing on child and adolescent income measurements are important - is the variation much of a concern when most studies have similar findings? The protocol seems to follow all of the correct guidance, but the guidance could be referred to more in the methods. Nevertheless, I look forward to seeing this systematic review published, and I imagine it will be important for research on children's inequality going forward.

I have some more detailed comments specific to each section that may improve the protocol:

Introduction

- The first paragraph is well structured, but could you give an example of how improving inequality may benefit outcomes? It may contextualise the work a bit better.
- Could you find a reference, or give an example, of how different instruments are used across different countries?
- I think you can remove the brackets on "as high-income respondents..." - it would flow better, and the sentence well explains what you mean.
- The work would benefit from some examples of tools to measure child or adolescent inequality. In terms of child-reported measures, a common one used is the Family Affluence Scale. It is also worth discussing how income inequality may be differently collected among adults and children.
- The reasons to perform this systematic review are clear, but it might be worth honing in a bit more on how measures of income depict different aspects of inequality, e.g. total income may be more generalised compared to net income, which suggests more about the disposable income families may have.

Methods

- Minor, but could you be consistent in 'socio-economic' or 'socioeconomic' throughout the text and figures - this may also be important for your search strategy.
- On that, for your search strategy, you may want to include 'socioeconomic status', 'socio-economic status', 'SES', etc. to capture the full realm of how scholars inconsistently define it.
- More search terms for income inequality may be 'relative poverty', 'affluence', 'deprivation'. I appreciate you may want to slim down your search terms so this review is not huge!
- You may want to consider the term 'Young people' but screen out if they include people over 18?
- It may be worth citing your motives to exclude grey or third-sector literature as this could be very helpful, e.g. WHO definitions - but you are likely to pick this up in peer-reviewed journals too I hope.

- Could you reference a definition of what low, medium, and high-income countries are so you are following an agreed understanding on this topic?
- Could you reference more standardised guidance in terms of the procedures you are conducting?
- I am assuming you will include mixed-method studies providing they have a quantitative element?

Strengths and limitations

- Could you draw on a systematic review that has researched socioeconomic status measures before, discuss the benefits of them, and then translate the intentions for your study?
- 'Limitations will exist' is a bit general. How about 'We anticipate that our research will have limitations in the areas of...'?
- I think the limitations section needs more work, e.g. studies that are not in English - that may exclude a large body of international knowledge, no grey literature, etc. They are fine limitations, but you need to be clearer in them.

Is the rationale for, and objectives of, the study clearly described?

Yes

Is the study design appropriate for the research question?

Yes

Are sufficient details of the methods provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Inequalities in child and adolescent health, adverse childhood experiences, parental behaviours, child wellbeing.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 26 May 2022

David O Driscoll , University College Cork, Cork, Ireland

Reviewer comment:

Overall, this protocol offers a promising and important question around income inequality measurement and child and adolescent outcomes. Research has shown that different measures of socioeconomic status often represent differing effects of inequality, e.g. parental education may be cultural, or knowledge-based, whereas income may represent material access. The protocol is clear to a large extent, but I think more can be done to really ground why focusing on child and adolescent income measurements are important - is the variation much of a concern when most studies have similar findings? The protocol seems to follow all of the correct guidance, but the guidance could be referred to more in the methods. Nevertheless, I look forward to seeing this systematic review published, and I imagine it will be important for research on children's inequality going forward.

Author response:

We thank the reviewer for their comments and for acknowledging that this piece of research may add to this research area.

Reviewer comment:

The first paragraph is well structured, but could you give an example of how improving inequality may benefit outcomes? It may contextualise the work a bit better.

Author response:

Thank you for your feedback. We have added the following in the introduction: **“Moreover, there is evidence that those individuals in a higher income bracket are healthier and that by addressing income inequality will improve health outcomes and health inequalities (Lynch et al., 2004)”**

Reviewer comment:

Could you find a reference, or give an example, of how different instruments are used across different countries?

Author response:

We thank the reviewer for their insightful comment. We were unable to source a definitive reference to support that instruments may be different across countries. Albeit, the final systematic review paper results may be able to provide insightful evidence as to which instruments are being used in different studies within different countries.

Reviewer comment:

I think you can remove the brackets on "as high-income respondents..." - it would flow better, and the sentence well explains what you mean.

Author response:

We thank the reviewer for identifying this error. The brackets have been removed.

Reviewer comment:

The work would benefit from some examples of tools to measure child or adolescent inequality. In terms of child-reported measures, a common one used is the Family Affluence Scale. It is also worth discussing how income inequality may be differently collected among adults and children.

Author response:

Thank you for your comment. We agree that additional measures are beneficial albeit this is not the focus of this systematic review. We have included an additional sentence to reflect that other measures do exist. We have included an additional line in main introduction text

that certain studies would use household/family income when studying children rather than adults which can be household/individual income level. **“The income data source used in child and adolescent studies is often at the household/family income level rather than individual level (Young, 2017)”**. We intend to discuss this area in greater detail in the final systematic review paper.

Reviewer comment:

The reasons to perform this systematic review are clear, but it might be worth honing in a bit more on how measures of income depict different aspects of inequality, e.g. total income may be more generalised compared to net income, which suggests more about the disposable income families may have.

Author response:

We thank the reviewer for their insight on this area. We agree that there are different aspects of inequality based on income. We added the following to the introduction: **“Martikainen et al, demonstrates that caution must be used in making associations between income types (e.g. household, individual, disposable) in mortality research and there is a need to better understand the role of individual income, household income and disposable income in understanding the association of income inequality and childhood outcomes (Martikainen, 2009).”**

Reviewer comment:

Minor, but could you be consistent in ‘socio-economic’ or ‘socioeconomic’ throughout the text and figures – this may also be important for your search strategy.

Author response:

Thank for identifying this inconsistency. We have changed all terms to socioeconomic in the protocol paper.

Reviewer comment:

On that, for your search strategy, you may want to include ‘socioeconomic status’, ‘socio-economic status’, ‘SES’, etc. to capture the full realm of how scholars inconsistently define it.

Author response:

We accept that there are inconsistent definitions. We are trying to focus our research piece on income only which is a part of socioeconomic status or position. As such, we will not be including socioeconomic status (SES) or socioeconomic position (SEP). We acknowledge this is a limitation and have included it in our limitations. Moreover, we are of the opinion this should be a separate distinct research project. **“This research focuses on objective income inequality instruments, it does not include other important aspects of poverty including socioeconomic position (SEP), other environmental factors (e.g. neighbourhood poverty) or other scales (e.g. Family Affluence Scale)”**. Moreover, at present the topic is very broad with the current search strategy even without SEP/SES. As such, we are trying to make it practical in an area that is very broad. We will discuss this more in the final systematic review paper.

Reviewer comment:

More search terms for income inequality may be 'relative poverty', 'affluence', 'deprivation'. I appreciate you may want to slim down your search terms so this review is not huge!

Author response:

We agree with the reviewer. We acknowledge that there are many 'relative' terms used in the literature and for the purpose of this systematic review, we decided to limit it to objective metrics of income inequality. We will include this discussion and limitation in the final systematic review paper.

Reviewer comment:

You may want to consider the term 'Young people' but screen out if they include people over 18?

Author response:

We thank the reviewer for this insight. We agree that the term "Young People" is now more collectively acceptable. We did not include "Young people" as when optimising the search terms, it did not obtain additional search hits.

Reviewer comment:

It may be worth citing your motives to exclude grey or third-sector literature as this could be very helpful, e.g. WHO definitions - but you are likely to pick this up in peer-reviewed journals too I hope.

Author response:

Thank you for your comment. Yes, we excluded grey or third-sector literature. This was to ensure that the systematic review was practical and achievable. We agree with your comment that we most likely have obtained same through peer-review journals, which is the focus of this review. We acknowledge that it may be a limitation and have included the following to the limitations section: "**We have not included grey literature, government reports and/or conference abstracts**".

Reviewer comment:

Could you reference a definition of what low, medium, and high-income countries are so you are following an agreed understanding on this topic?

Author response:

Thank you for your comment, the definition we identified is based on the World Bank definition (2021-2022). <https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2021-2022>. The following sentence was added to the introduction for clarity: "**Moreover, inequality instruments across countries may vary, and differences exist in data sources and definitions (e.g. New-world bank classification of lower-middle, upper-middle, and high income) (World Bank Country and Lending Groups, 2021).**"

Reviewer comment:

Could you reference more standardised guidance in terms of the procedures you are conducting?

Author response:

Thank you for your comment. We highlighted the reporting guidelines (PRISMA-P checklist) under Reporting guidelines.

Reviewer comment:

I am assuming you will include mixed-method studies providing they have a quantitative element?

Author response:

Yes, mixed methods will be included provided they meet the inclusion criteria.

Reviewer comment:

Could you draw on a systematic review that has researched socioeconomic status measures before, discuss the benefits of them, and then translate the intentions for your study?

Author response:

We thank the reviewer for their comment. We did a preliminary search and did not identify a systematic review of quantitative income inequality instruments in our area. . The aim of this piece of work is limited and not including socioeconomic status or position measures. We agree, this is an important area and this is worth being part of a discussion in the final systematic review paper as a limitation.

Reviewer comment:

'Limitations will exist' is a bit general. How about 'We anticipate that our research will have limitations in the areas of...'?

Author response:

Thank you for your feedback. We have changed this sentence to **“The authors anticipate that our research will have limitations”**.

Reviewer comment:

I think the limitations section needs more work, e.g. studies that are not in English - that may exclude a large body of international knowledge, no grey literature, etc. They are fine limitations, but you need to be clearer in them.

Author response:

We have updated the limitations section to include additional limitations: **“The authors anticipate that our research will have limitations. It is possible that relevant studies may not be found. We have limited our search time-period and as such, it will not reflect the use of income inequality metrics prior to our inclusion dates. This research focuses on objective income inequality instruments, it does not include other important aspects of poverty including socioeconomic position (SEP), other environmental factors (e.g. neighbourhood poverty) or other scales (e.g. Family Affluence Scale) . We have not included grey literature, government reports and/or conference abstracts. This review will focus on studies that include income inequality as a primary exposure. Income inequality measures investigated as a secondary exposure will not be included. This is to ensure the review is practical, achievable, and relevant.”**

Competing Interests: No competing interests were disclosed.

Reviewer Report 18 January 2022

<https://doi.org/10.21956/hrbopenres.14664.r31105>

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Richard M. Duffy 

Department of Psychiatry, Rotunda Hospital, Dublin, Ireland

O Driscoll *et al.*, have set out to undertake an important study on a topic that lacks clarity, yet is highly consequential. They have laid out their study protocol in this paper. Overall the methodology appears sound and the details of the study are clearly described.

Small changes may improve the clarity of the protocol:

- First aims b) and c) could be reworded to be clearer.
- On review of the search terms, there may be a role for expanding them, for example 'minors' and 'wealth' could be included.
- In the introduction or with the inclusion and exclusion criteria it would be interesting to see a brief discussion of subjective income inequality or the protocol could just state that it is only looking at objective income inequality. If it is looking at both this could be added to table 2.
- Table 2 could also include a reference to frame as income inequality can be measures at a national, regional or local level, this may be covered under the existing term 'study setting'.
- In the inclusion criteria it would be helpful to be more explicit about how studies with minors and adults are dealt with. Also the authors could clarify how studies that have taken an ecological approach to look at income inequality are dealt with.

Despite these minor comments, this is a well written and clear protocol that is well designed.

Is the rationale for, and objectives of, the study clearly described?

Yes

Is the study design appropriate for the research question?

Yes

Are sufficient details of the methods provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: The majority of my current work is on mental health law, but in the recent past I have researched subjective wellbeing variations during the recession, health outcomes in

minority groups (asylum seekers and migrant populations).

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 26 May 2022

David O Driscoll , University College Cork, Cork, Ireland

Reviewer comment:

O Driscoll et al., have set out to undertake an important study on a topic that lacks clarity, yet is highly consequential. They have laid out their study protocol in this paper. Overall the methodology appears sound and the details of the study are clearly described.

Author response:

We thank the reviewer for their feedback.

Reviewer comment:

Small changes may improve the clarity of the protocol:
First aims b) and c) could be reworded to be clearer.

Author response:

We edited both (b) and (c) to provide greater clarity. **"...(b) to ascertain if the frequency of quantitative income inequality instruments varies depending on characteristics (e.g. country, health outcome etc), (c) to determine the different wealth sources (e.g. survey data, taxation data) used to calculate each income inequality instrument,...."**

Reviewer comment:

On review of the search terms, there may be a role for expanding them, for example 'minors' and 'wealth' could be included.

Author response:

We agree that the term wealth and minors may assist in the search scope, since we have begun the search, we will acknowledge that these terms were not included and may reflect a search limitation. This will be included as a limitation when the systematic review is completed.

Reviewer comment:

In the introduction or with the inclusion and exclusion criteria it would be interesting to see a brief discussion of subjective income inequality or the protocol could just state that it is only looking at objective income inequality. If it is looking at both this could be added to table 2.

Author response:

We agree that it is objective only. This has been made clear in the text. This has been included in the inclusion and exclusion criteria. **"....focusing on income inequality as the primary (main) study question in children and adolescents will be included (i.e. less than 18 years of age only)."**

Reviewer comment:

Table 2 could also include a reference to frame as income inequality can be measured at a national, regional or local level, this may be covered under the existing term 'study setting'.

Author response:

We agree that this would be helpful and have included a comment under Data extraction in parenthesis “...including if the instrument reflects national, regional or local level data”.

Reviewer comment:

In the inclusion criteria it would be helpful to be more explicit about how studies with minors and adults are dealt with. Also the authors could clarify how studies that have taken an ecological approach to look at income inequality are dealt with.

Author response:

We have added an adjustment under Types of study to be included to make it more explicit the age profile “...i.e. **less than 18 years of age only**”. We have decided to exclude ecological approach studies as they do not use income data at individual level/household level which is the focus of this review and added it to the exclusion criteria section “**Exclusion criteria: The following study designs (qualitative, case studies, randomised control trials, reviews, discussions, ecological and commentaries)**”

Reviewer comment:

Despite these minor comments, this is a well written and clear protocol that is well designed.

Author response:

We thank the reviewer for their insightful feedback and helpful suggestions to improve the quality of this piece of work.

Competing Interests: No competing interests were disclosed.