## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | Socio-Economic Determinants of Risk of Harmful Alcohol Drinking among People aged 50 or over in England |
| **AUTHORS** | Iparraguirre, Jose |

## VERSION 1 - REVIEW

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| **REVIEWER** | Dr Rahul Rao<br>South London and Maudsley NHS Foundation Trust and Institute of Psychiatry |
| **REVIEW RETURNED** | 18-Jan-2015 |

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| **GENERAL COMMENTS** | Although the main hypothesis of this study is described clearly and the methodology used to test it is robust, the conclusions are too cursory. There are several significant and non-significant associations that require further elaboration, not least of which are possible explanations for the changes in alcohol use in this cohort between waves 4 and 5. The study's limitations are listed in the early part of the paper, but are not drawn out further in the conclusions.<br><br>For this paper to be acceptable for publication, there needs to be further discussion that links to existing literature on the area of study. In particular, it is essential that the following areas are discussed and cross-referenced the evidence base:<br><br>1) The decline in alcohol consumption with age<br>2) Possible differences between this and past/future cohorts<br>3) The influence of 'sick quitters' on the selection of the initial sample<br>4) The influence of under-reporting in under-estimating alcohol consumption<br>5) Making use of the category of 'high risk' drinking as a proxy for alcohol misuse and linking this with other studies<br>6) Possible reasons for positive associations with depression and negative associations with some social variables<br><br>If the author could make use of the findings to offer some possible explanations by referring to existing literature, this paper would be suitable for publication, but would need major revision to achieve this. |

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| **REVIEWER** | Clare Holdsworth<br>Keele University UK |
| **REVIEW RETURNED** | 03-Feb-2015 |

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| **GENERAL COMMENTS** | The paper investigates the risks of being at risk of 'alcohol abuse' |

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| | among respondents to Wave 5 of ELSA and the risks associated with becoming a heavy drinker or ceasing to be a heavy drinker between waves 4 and 5. The authors could consider:<br>1. The review of existing literature on heavy drinking in later life could be clearer, it lists the different risk factor and does not really provide a synthesis. The relevance of the cultural context of drinking could be acknowledged - in Anglo European societies alcohol consumption declines in later life, but this is not found in all countries and the relevance of analysis of drinking in countries with drinking behaviours needs to be considered. The new findings presented in the paper also need to be clearer.<br>2. The title of this paper refers to risk of alcohol abuse, but more care needs to be taken in how this is defined. The analysis identities older people at risk of drinking more than 50 or 35 units per week for men and women respectively. This is usually defined in the literature as harmful drinking (or drinking over harmful limits) and it would be more appropriate if this descriptor was used rather than the more emotive term 'alcohol abuse'. The later may be taken to refer to alcohol dependency which is usually measured using a scale such as CAGE which is not available in ELSA. Harmful drinking is not the same as alcohol dependency and this needs to be clearer in this paper.<br>3. This measure of harmful drinking is rather arbitrary yet the use of a cut-off around 50/35 units is not discussed in the paper. The methodology used relies on this boundary being meaningful and the authors could discuss this as a limitation of the analysis. Related to this the conversion of drinks to unit is on the high side – all glasses of wine and pints of beer are coded as equivalent of 3 units, but this would suggest all glasses of wine are large (250ml) and all beer is strong. How would the analysis of harmful drinking change if the number of units for wine/beer was set at 2.5? It is worth noting that the % of adults classified as harmful drinkers is greater than that found in earlier waves of ELSA for which the questions on alcohol were more detailed than the three questions included in later waves (ie it is possible to be more precise in coding units of alcohol in earlier waves of ELSA and in these waves there are fewer adults classified as harmful drinkers).<br>4. The analysis of change in risk of harmful drinking between waves 4 and 5 amplifies the relevance of this boundary, yet some of the change in risk identified could be relatively insignificant, for example a reduction from 50 to 48 units for men. The authors could provide further contextual information of the drinking behaviours of groups identified as crossing this boundary. Any notion if harmful/heavy drinking will be arbitrary to a certain extent and this needs to be acknowledged in the analysis. Some form of discrepancy score approach could be used to explore increases/decreases in older people's drinking?<br>5. Sections of the paper that discuss analysis not presented in the paper do not really add much to the argument and could be removed (eg discussion of area analysis) and this space used to discuss the issues outlined above.<br>6. I am not convinced that the characteristics identified with a change in behaviour out of harmful drinking among men could be used to inform interventions as these point to the importance of increasing age, low income and being lonely. It is not possible to design an intervention to increase age, and interventions that lowered income or increased loneliness would be not be possible or acceptable. A more reasonable conclusion would be that tacking harmful alcohol consumption among the elderly is problematic as the known risk factors highlight how 'successful' ageing is associated |

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| | with higher alcohol consumption. At best the findings highlight the characteristics of individuals for whom an intervention could be targeted.<br>7. There is no reference to earlier waves of ELSA and while these data are not used it is relevant to point out that this is a longitudinal data set.<br>8. Finally with reference to the above points, particularly around the difficulty of measuring alcohol consumption in ELSA and defining harmful drinking, the limitations of the study need to be outlined and discussed. |

**VERSION 1 – AUTHOR RESPONSE**

Comments by Dr Rahul Rao

1) The decline in alcohol consumption with age.
I have expanded the discussion on the association between age and alcohol consumption, particularly as the new results find a non-linear association among men, with a peak in the mid-60s.

2) Possible differences between this and past/future cohorts
The non-linearity mentioned above led to a comment about the possibility of current cohorts of older people carrying on the relatively higher alcohol consumption levels they exhibited in their youth into their old age -a finding recently reported in the literature.

3) The influence of 'sick quitters' on the selection of the initial sample
The revised version of the manuscript includes a statistical analysis of attrition by wave 5 due to consumption levels in wave 4 (initial wave in the study). We failed to find any 'sick quitter' effects.

4) The influence of under-reporting in under-estimating alcohol consumption
This comment led me to correspond with Dr Sadie Boniface who recently published on under-reporting of alcohol consumption using the same dataset as in this paper (Dr Boniface used the Health Survey for England, which shares the respondents with ELSA). Dr Boniface confirmed me that age is not associated with under-reporting among people aged 50 or over. The revised version mentions this finding.

5) Making use of the category of 'high risk' drinking as a proxy for alcohol misuse and linking this with other studies
This has been suggested by the other reviewer, and it led to two sensitivity analyses which are explained in the comments to Prof Holdsworth below and included in the new version of the manuscript.

6) Possible reasons for positive associations with depression and negative associations with some social variables
The new results failed to find any associations with depression. Findings for other variables are discussed.

Reviewer Name Clare Holdsworth
1. The review of existing literature on heavy drinking in later life could be clearer, it lists the different risk factor and does not really provide a synthesis. The relevance of the cultural context of drinking could be acknowledged - in Anglo European societies alcohol consumption declines in later life, but this is not found in all countries and the relevance of analysis of drinking in countries with drinking

behaviours needs to be considered. The new findings presented in the paper also need to be clearer.

This new version of the manuscript comments on the cultural context.

2. The title of this paper refers to risk of alcohol abuse, but more care needs to be taken in how this is defined. The analysis identities older people at risk of drinking more than 50 or 35 units per week for men and women respectively. This is usually defined in the literature as harmful drinking (or drinking over harmful limits) and it would be more appropriate if this descriptor was used rather than the more emotive term ‘alcohol abuse’. The later may be taken to refer to alcohol dependency which is usually measured using a scale such as CAGE which is not available in ELSA. Harmful drinking is not the same as alcohol dependency and this needs to be clearer in this paper.

I have replaced 'abuse' with 'harmful drinking' throughout the manuscript and also commented on the difference between the latter concept and dependency.

3. This measure of harmful drinking is rather arbitrary yet the use of a cut-off around 50/35 units is not discussed in the paper. The methodology used relies on this boundary being meaningful and the authors could discuss this as a limitation of the analysis. Related to this the conversion of drinks to unit is on the high side – all glasses of wine and pints of beer are coded as equivalent of 3 units, but this would suggest all glasses of wine are large (250ml) and all beer is strong. How would the analysis of harmful drinking change if the number of units for wine/beer was set at 2.5? It is worth noting that the % of adults classified as harmful drinkers is greater than that found in earlier waves of ELSA for which the questions on alcohol were more detailed than the three questions included in later waves (ie it is possible to be more precise in coding units of alcohol in earlier waves of ELSA and in these waves there are fewer adults classified as harmful drinkers).

I carried out two sensitivity analysis, one changing the definition of 'higher risk' and the other one changing the measurement units. In each case, I used two alternative procedures -and also the main results now come from a different conversion units.
First, regarding the definition of 'higher risk', I used NICE's definition but contrasted it with two alternative definitions -one using lower cut-off points and one using higher cut-off points.
Second, concerning conversion units, I used the NHS Alcohol Unit Calculator (upon which in this version of the manuscript the main results are based) and contrasted the results with those obtained by using the ratios in the drinkaware website and in the 2007 General Lifestyle Survey.
All the results are presented in an Annex.

4. The analysis of change in risk of harmful drinking between waves 4 and 5 amplifies the relevance of this boundary, yet some of the change in risk identified could be relatively insignificant, for example a reduction from 50 to 48 units for men. The authors could provide further contextual information of the drinking behaviours of groups identified as crossing this boundary. Any notion if harmful/heavy drinking will be arbitrary to a certain extent and this needs to be acknowledged in the analysis. Some form of discrepancy score approach could be used to explore increases/decreases in older people's drinking?
See previous response.

5. Sections of the paper that discuss analysis not presented in the paper do not really add much to the argument and could be removed (eg discussion of area analysis) and this space used to discuss the issues outlined above.

I have omitted this paragraph.

6. I am not convinced that the characteristics identified with a change in behaviour out of harmful drinking among men could be used to inform interventions as these point to the importance of increasing age, low income and being lonely. It is not possible to design an intervention to increase age, and interventions that lowered income or increased loneliness would be not be possible or acceptable. A more reasonable conclusion would be that tacking harmful alcohol consumption among the elderly is problematic as the known risk factors highlight how 'successful' ageing is associated with higher alcohol consumption. At best the findings highlight the characteristics of individuals for whom an intervention could be targeted.

I have changed the wording accordingly.

7. There is no reference to earlier waves of ELSA and while these data are not used it is relevant to point out that this is a longitudinal data set.

I mention that the study is restricted to two waves, and that the estimations in Table 5 are based on a cross-section.

8. Finally with reference to the above points, particularly around the difficulty of measuring alcohol consumption in ELSA and defining harmful drinking, the limitations of the study need to be outlined and discussed.

I have expanded the discussion about the limitations of the study.

**VERSION 2 – REVIEW**

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| **REVIEWER** | Dr Rahul Rao<br>Institute of Psychiatry, Psychology and Neurology, London, UK |
| **REVIEW RETURNED** | 01-Mar-2015 |

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| **GENERAL COMMENTS** | The author has addressed my original points adequately so as to justify acceptance of this paper. |

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| **REVIEWER** | Clare Holdsworth<br>Keele University, UK |
| **REVIEW RETURNED** | 13-Mar-2015 |

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| **GENERAL COMMENTS** | The author has responded to the referee's comments comprehensively and the additional analysis, while not changing the findings, make the argument more robust. However there a few minor errors to clear up:<br>page 14 para 3: the first sentence needs rewriting. It appears that the definition of units does make a difference to the analysis of crossing the threshold between drinking types, this is probably tautological (as the definition of units will define where the boundary is), this could be clarified.<br>Conclusions: This is much improved, though the second paragraph does make sense on its own. The last sentence in paragraph 2, page 15 (beginning Nevertheless, it should give policy..) does not make sense and should be rewritten. |

## VERSION 2 – AUTHOR RESPONSE

I re-wrote the para 3 on page 14. I made it clear that the definitions of units does make a difference. I also changed the second paragraph on page 15. I trust the link between the findings and the successful ageing is clearer and I have added a recommendation in this regard.