Reviewer's report

Title: Impact of Family Average Income on Stroke Prevalence among Urban and Rural Residents in Regional Mainland China

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Reviewer: Mauricio Avendano

Reviewer's report:

General
This is an interesting study that examines whether there is an inverse association between socioeconomic status and stroke prevalence in China. This study assesses whether this association, reported repeatedly in Western populations, is also present in China. Interestingly and in contrast to results for Western populations, Authors conclude that higher (family) income is associated with higher stroke prevalence. This paper is an extension of previous work showing similar patterns for Diabetes and overweight and recently published by the authors. The paper is of great potential interest to the wide scientific community, as the results may be relevant not only for stroke but also for the understanding of health disparities in general. The paper can be further improved by addressing the issues below:

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. A major limitation that could explain the results is differential self-reporting: The lower income groups may have had less access to care and diagnosis techniques as well as less education, and therefore may be more likely to underreport stroke. As stroke ascertainment is initially based on self-report (even though for those who self-reported checks are performed), the fact that the lower SES groups have lower stroke may simply be an artifact of poor diagnosis or underreporting for a number of different reasons, as opposed to the higher SES groups. This needs to be addressed in a better way in the discussion section.

2. Discussion section: A more thorough discussion of the possible explanations of this contrasting pattern is needed in the paper, particularly if aimed at raising interest in the wider scientific community working on this field. In particular, authors need to address the question of what is so specific about China that is not present in Western populations, where the opposite association between income and stroke has been observed. Authors briefly touch upon these issues, but a specific matter is only vaguely explored, namely the role of the epidemiological transition. Can this theory provide an explanation for the results? In which way may China be an earlier stage of the epidemiological transition than Western populations such as the US and Western Europe?
3. In regard to point 2 above, I think it is important to have a discussion about the possible risk factors that have a distribution that is consistent with the observed results. Diet is an interesting candidate, but there is little discussion on this in the paper, e.g., Is there evidence of a dietary change in the higher SES groups that has not yet reached those in the lower classes? Has the adoption of Western diets occurred faster among those with high income, whereas those in the low income groups preserve relatively traditional diets less full in fat? Is there a potential role for psychosocial pathways, e.g., higher stress or depression levels among the higher SES groups, which may place them at higher risk of stroke?

4. Discussion: This study should discuss in more detail two major limitations related to the cross-sectional nature of this study: (1) No causality assumptions from income to stroke can be inferred. Because prevalence is a the combined result of both incidence and survival, a possible explanation for the results could be that the lower SES groups are less likely to survive an incident stroke (e.g., because they receive worse care), and therefore they may have lower prevalence than the higher SES groups, which may be more likely to survive an incident stroke because they receive better care. Thus, in theory, results could be an artifact of this cross-sectional analysis. (2) Since the study is cross-sectional, part of their association may reflect the impact of stroke on income. Although this cannot not explain the positive association between stroke and income, it deserves to be mentioned as this is based on cross-sectional data.

5. An important question is whether competing causes of death may play a role in the explanation of these results: Is it possible that those in the low income groups die from other causes that usually occur earlier in life, e.g., infectious diseases? It may be possible that the lower socioeconomic groups ‘do not live long enough’ to experience stroke later in life, but die from other causes, whereas the higher SES groups get very little of other diseases and then may go on to die from cardiovascular disease at later ages.

6. Implications: The implications of the study need to be substantially improved in the light of the transition that China appears to be experiencing. Authors state that interventions should focus on the high socioeconomic groups. Another way to look at this problem is that unhealthy diets and behaviors are spreading to China and are now reaching those in the higher SES groups, as it was also observed in other Western countries (e.g., in England, smoking prevalence was first higher in the highest SES groups, but then the association reversed so that in recent years the lower SES groups smoke considerably than the higher SES groups). If the pattern continues in the same way as in Western populations, these lifestyles will most likely spread throughout the rest of the Chinese population and eventually the lower SES groups. Bottom point: Implications should point at the importance of preventing this transition in China, or addressing the negative health consequences of it.

7. A particular issues may be worth highlighting in the discussion: Authors find that even thought the higher SES groups smoke less than those in the low SES groups, they have higher stroke prevalence. This finding questions evidence from previous studies suggesting that smoking is an important factor explaining stroke disparities, because even in a society where smoking is more prevalent in the
lower SES groups, a positive association between income and SES is observed.

8. Table 1 presents row percentages, e.g., among those aged 35-49, which proportion belonged to each age group. This is inconvenient and makes the table difficult to interpret. What is of interest here is whether the prevalence of risk factors or other demographic factors differs according to income. Thus, I suggest authors re-design this table by presenting column percentages by income, e.g., Among those in the low income group, which proportion is a current smoker; then separately for the middle and high income groups as well.

9. Have standard errors been adjusted for the clustered sample design? If not, how could this influence the result?

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Minor comments:

10. Tables 2 & 4 wrongly refer to ‘Type 2 Diabetes’ in their legends, whereas they should refer to STROKE.

11. Although the article is in general well written, there are a number of issues in the English writing that need to be improved and corrected.

12. In the methods section, more information is needed on how the risk factors were measured and how the categories of these variables were entered in the analysis.


14. Page 6, paragraph 1: Please specify in more detail to what extent information on medical records was available for stroke cases, e.g., 90% of cases? Half of cases?

15. Results, page 7 and on: When discussing results and referring to odds ratios, it is confusing to stage e.g., 40-fold times for an odds ratio of 22. Present in the text consistently odds ratios (e.g., 22) and not prevalence ratios (e.g., 40).

16. Page 9, paragraph 1: Author state ‘… after holding potential confounders constant, only men within higher FAI category remained at higher risk of having stroke compared to their counterparts within low FAI group’. This is not entirely true as an increased risk remained also among women, even though the confidence intervals were wider –but I suggest authors do not interpret these CI so literally, but rather as a measure of precision.

Discretionary Revisions (which the author can choose to ignore)

What next?: Accept after minor essential revisions
Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

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