Peer Review Report

Review Report on Urban versus Rural: general and vulnerable population's healthcare system satisfaction in Europe

Original Article, Int J Public Health

Reviewer: Daniel Ludecke
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EVALUATION

Q 1 **Please summarize the main findings of the study.**

The main finding of this study suggest that satisfaction with thje healthcare system is affected by financial or health vulnerabilities. Furthrtmore, these results are moderated by area of living.

Q 2 **Please highlight the limitations and strengths.**

The strength of this study is the large sample size and the possibility to study changes over time. Furthermore, the study uses reasonable indicators to answer the research question. Limitations are the small variations between different predictors and that not all detected patterns can be explained by the data and conducted analysis.

Q 3 **Please provide your detailed review report to the authors. The editors prefer to receive your review structured in major and minor comments. Please consider in your review the methods (statistical methods valid and correctly applied (e.g. sample size, choice of test), is the study replicable based on the method description?), results, data interpretation and references. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.**

Minor issues
Abstract:
- Line 7, Objectives: The objectives start with "Access to the system". Please add "healthcare" to be more specific.
- Line 18, Results: Please attenuate your presented results. The sentence "people living in big cities were strongly affected by health vulnerabilities while people living in countryside homes were affected by financial vulnerabilities" implies much larger differences than we actually find in table 1. There are 9.4% with financial vulnerability in big cities, but also 8.6% in a country village, so there doesn't seem to be a strong dichotomy between rural and urban.
- Line 20, Conclusion: This is a very strong conclusion, which is not backed up by the data. If the authors analysed satisfaction between people living in rural or urban areas, they cannot draw conclusion regarding the "equal access to the health system".

Introduction:
- Line 34: I don't think the purpose of a healthcare system can be to "offer (...) health". Please rephrase.

Methods:
- Line 78: The sampling is no classical random sampling, but rather a random probability sampling at different stages. Please revise the sentence.
- Line 136: The last sentence of this section is not finished.

Results:
- Line 166: The authors write that "life satisfaction was highly correlated with healthcare system satisfaction". If I haven't missed anything, I don't think the presented estimates in table 2 are standardized. Thus, a one-

unit change in life satisfaction leads to a ~ 0.23 points change in healthcare system satisfaction. Regarding the scale (range) of the outcome, I wouldn't consider this as "highly correlated". Please rephrase.
- Line 168-171: That sentence should be revised. First, we don't have "estimates from groups of inhabitants"; second, the last part "in a multivariable model…" is redundant.
- Line 177: The absence of statistical significance does not imply that there's no effect ("the absence of evidence is not the evidence of absence"), rather, that there is no clear evidence about the sign of the association. Please rephrase.

Discussion:
- Line 218: See comment above, if the results can really be interpreted as "strong correlation".
- Line 244: Access to healthcare was not measured in this study. Please revise.
- Line 252: Why is life satisfaction the variable with the greatest influence on healthcare system satisfaction? According to table 2, there are other variable with larger coefficients, however, since the independent variables are on different scales, these are not comparable if presented in an unstandardized form.
- Line 256: "A happy exception" sounds a bit sloppy, please rephrase.
- Line 281: The interpretation that social and health privileges lead to lower satisfaction due to higher demands seems too bold to me.

Major issues
Introduction:
- In general, while the introduction starts with satisfaction with the healthcare system, later access to the healthcare system and health behaviour as topics are mentioned. However, the importance or reason why these two topics are introduced, remains unclear. In particular, since the title is about satisfaction and the last paragraph in the introduction points out that the main interest is the association between satisfaction and financial/health vulnerabilities (while access and behaviour no longer seem to play a role), it's not clear why "access" and "behaviour" are mentioned. I suggest a major revision of the introduction, where the summarized current state of research leads to the research interest of this paper.

Methods:
- Lines 104-108: Please explain the rational why dichotomization for financial vulnerability was made the way describes in the paper. "Living comfortably" seems to be more far away from "finding it difficult" than "finding it very difficult". Why aren't the latter to options combined into one category? Since this is one of the main predictors of satisfaction, the recoding should be very well justified. The authors may refer to the next section, where they describe the model comparison using BIC, and if this was the reason for the decision on this split. Probably an even better option the authors may want to consider would be including that variable on its original scale (as an ordinal predictor), i.e. to take the factor variable and contrast-code it as successive differences (see ?MASS::contr.sdif). It would be even possible to constrain the coefficients to be all positive (or negative, if required, see https://stackoverflow.com/questions/68546489/how-to-obtain-monotonic-effect-of-ordered-factor-predictor-in-lme4-package). Then the predictor could be interpreted in terms of "gradient" association.
- Lines 108-113: Same for the second main predictor. Why splitting the two "yes" options?
- Line 129: Here you describe the alternative way of dichotomizing and model selection. Maybe you could already mention in the previous section that the rationale behind where to split the categories was based on a model comparison using BICs, and refer to the section "statistical methods". Please note that using information criteria for model comparison only makes sense when models are fitted with maximum likelihood, not REML (the default for mixed models, at least lme4). Please indicate whether you used the correctly computed BICs to compare those models.

Results:
- Lines 180 following: This is the first time a moderation analysis is mentioned. Please provide details about the analysis in the methods section, e.g. if the results are based on a similar mixed model, but including interaction terms. Furthermore, it looks like figures 1A and 1B show estimated marginal means, but this is only a guess. The authors should provide more details about the methods leading to the results of the figures. Also, if these are pairwise comparisons of estimates marginal means, have these been adjusted for multiplicity?

Discussion:
- Line 220: Effect sizes are mentioned in the discussion, but have not been reported in the results before. Furthermore, there are no details in the methods section how these effect sizes are obtained. Please add some more information about these aspects.
- Line 230-237: I don't think missing causality is a problem when the goal is to investigate associations between predictors and outcome. However, there are other (methodological) limitations that should be mentioned. For instance, how do rural vs. urban areas differ between European countries? There might be large variations between countries that could not be analysed in detail. Furthermore, the above mentioned issues regarding the measurement and recoding of predictors should be discussed in the limitations. Finally, the rather small effects / coefficients should be mentioned as a limitation.
- Line 262-264: That interpretation is very brave in the light of missing support from the data. The authors should make sure that their conclusions are not too far away from the data and results.
- Line 267: On what results is the conclusion based that suburbs of big cities are underserved in comparison to other rural areas? I also couldn't find any claims in the references article (38). Please check the reference, and provide some more details that back up these claims, or weaken the statements a bit.
- Lines 269-273: This is rather a repetition of previous description of results, not an interpretation. Please revise.
- In general, the interpretation of results lacks a larger embedding into the current state of research. I am missing more references to other studies that support or contradict the findings, and how these possible similar or contradicting results can be interpreted.
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PLEASE COMMENT

Q 4 **Is the title appropriate, concise, attractive?**

Yes.

Q 5 **Are the keywords appropriate?**

No, Access to care, e.g., is not measured.

Q 6 **Is the English language of sufficient quality?**

No, I strongly suggest proof-reading by a native speaker or English language expert.

Q 7 **Is the quality of the figures and tables satisfactory?**

Yes.

Q 8 **Does the reference list cover the relevant literature adequately and in an unbiased manner?)**

Yes.

QUALITY ASSESSMENT

Q 9 **Originality**

Q 10 **Rigor**

Q 11 **Significance to the field**

Q 12 Interest to a general audience

Q 13 Quality of the writing

Q 14 Overall scientific quality of the study

REVISION LEVEL

Q 15 Please make a recommendation based on your comments:

Major revisions.