Author’s response to reviews

Title: The Impact of National Health Insurance (NHI) upon accessibility of health services and financial protection from catastrophic health expenditure: a case study of Savannakhet province, Lao PDR

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The Impact of National Health Insurance (NHI) upon accessibility of health services and financial protection from catastrophic health expenditure: a case study of Savannakhet province, Lao PDR
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Health Research Policy and Systems

Answer to the second comments

Reviewer #1: The revised version of the manuscript is much improved. However, I think honestly reader would find little interest in this paper. Comparing with health insurance schemes, the NHI (flat fee payment system) is more attractive for poor. Because they don't have to pay for insurance fee in advance. They just utilize the NHI only when they have a health problem. It might be obvious.

Answer to reviewer #1: We would like to express a sincere thanks for the comment stating that this study could be less interesting in comparison to other health insurance scheme due to its (NHI) flat fee payment system. We are also agreed with this comment. May we take this take this opportunity to clarify that Lao is very poor country people are reluctant to use health services even they free of charge because they are worrying about non-medical expenditure such as transportation cost (of patients and their companies, which mostly followed by whole families), and food expenditure during their stay in hospital. As a result, this study was conducted to find out if the newly piloted NHI can enhance access to health service utilization and financing projection for poor households. Another important issue is that this study possibly able to provide another important aspect of health financing schemes in poor countries since most of which are currently relying on out-of-pocket expenditure. As the very first study about NHI, we do believe and hope that this study possibly provides a piece of knowledge and reference for health financing policymakers to create a more sustainable health financing scheme in the
Reviewer #2: Manuscript Review (2nd Review)

* The authors did a great job in incorporating comments and providing explanation to reviewers.
* The authors may consider adding some of the explanations to the paper in the form of footnotes.

Thank you very much for all the comments provided in the previous point-to-point comments, it was such a great opportunity to learn from you especially the way interpreting statistical analysis that greatly enhance quality of this research.

Revision and Suggestions

1. Data:
   a. In Table, 2& 3, the authors may consider adding a note at the end of the table if the summary is from the survey year 2013, 2016, or 2018.

   Answer 1a: the footnote “Based on the 2018 data collection in Kaysone Phomvihane and Champhone district of Savannakhet province” has been added at the ended of table 2 & 3.

   b. In Table, 2& 3, what are the means of hospitalization and catastrophic spending for the entire sample? I'm not sure if it's already mentioned in the paper.

   Answer 1b: it should be recalled that in this study we do not calculate mean or average number of hospitalizations. As a result, table 2 shows that the total number of households that have ever used health services and household without any health service utilization. This table shows that according to the 2018 survey, there was 236 households reported no health service utilization, whereas 106 households experienced at least once.

2. Result:
   a. In Table 4 & 5, should the column 2-3 & 6-7 be titled "controlling insurance status", as opposed to column 4-5 & 8-9? Alternatively, do you subsample regression? If it's the latter case, may I suggest adding observations on the bottom of the table?

   Answer 2a: thank you very much for this comment. It’s our mistake, the column 2-3 & 6-7 should be titled "controlling insurance status” as you suggested.

   b. For both Table 4 & 5, would you consider adding R-squared value or other goodness-of-fit measures suitable for logistic regression? It may not be key to interpretation but some audience may be interested in the values.
Answer 2b: It is such a good idea to estimate the goodness-of-fit to measure logistic regression. However, regular R-squared value are not capable to measure goodness-of-fit for binary logistic regression. On the other hand, there are two good-of-fit measurement namely (pseudo R-squared statistics): Cox & Snell R Square, and Nagelkerke R Square. In this case, we opt to use Nagelkerke due to the fact that the Cox & Snell measurement tends to produce more conservative pseudo R-squared.

Table 4: Probability of hospitalization under CBHI and NHI scheme

<table>
<thead>
<tr>
<th></th>
<th>CBHI scheme 2013</th>
<th>CBHI scheme 2016</th>
<th>NHI 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cox &amp; Snell R square with insurance status: 0.054</td>
<td>Nagelkerke R square with insurance status: 0.076</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nagelkerke R square with insurance status: 0.076</td>
<td>Nagelkerke R square with insurance status: 0.097</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cox &amp; Snell R square without insurance status: 0.049</td>
<td>Cox &amp; Snell R square without insurance status: 0.055</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nagelkerke R square without insurance status: 0.069</td>
<td>Nagelkerke R square without insurance status: 0.076</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Probability of having a financial catastrophe under the CBHI and NHI scheme

<table>
<thead>
<tr>
<th></th>
<th>CBHI scheme 2013</th>
<th>CBHI scheme 2016</th>
<th>NHI 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cox &amp; Snell R square with insurance status: 0.444</td>
<td>Nagelkerke R square with insurance status: 0.594</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nagelkerke R square with insurance status: 0.583</td>
<td>Nagelkerke R square with insurance status: 0.436</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cox &amp; Snell R square without insurance status: 0.313</td>
<td>Cox &amp; Snell R square without insurance status: 0.415</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nagelkerke R square without insurance status: 0.415</td>
<td>Nagelkerke R square without insurance status: 0.313</td>
<td></td>
</tr>
</tbody>
</table>

C. For Table 5, I can see that the results in column 4-5 & 8-9 are not very different from column 2-3 & 6-7, respectively. I think it's appropriate to add a brief explanation mentioning why you choose to focus the interpretation on column 2-3 & 6-7, as opposed to 4-5 & 8-9. Also, providing a brief reasoning why these two regressions (with and without the insurance indicator) are insightful is useful to audience.

Answer 2c: Due to the fact that the result in column 4-5 & 8-9 are not very different from column 2-3 & 6-7, respectively. For simplicity reason we decide to include only logistic regression controlling insurance status (with insurance status for CBHI scheme), rather than explain similar results of logistic scheme in column 2-3 & 6-7 regression (without insurance status for CBHI). To improve readers’ understanding, we have added some explanation related to column 2-3 & 6-7 as follows (see
Table 4: “in which, the binary logistic regression on probability of health service utilization under CBHI scheme in 2013 (without insurance status included in the model) found that household with chronic condition has 1.796 times higher probability of using health services compare to healthy households without existence of chronic condition. However, the notable difference this case is not statistically significant at 95%. Based on the in data acquired in 2016, similar logistic regression shows that chronic condition still being the most important factor behind health service utilization”.

Table 5: the logistic regression model predicting the probability of financial catastrophe (without insurance variable) yields very similar results. In 2013, the highest income quintile (more than 2.5 million LAK or 300 USD) and the middle-income quintile (1 million or 120 USD to 2.5 million or 300 USD) are 0.056 and 0.045 time when compare to low income household, respectively.

d. What's the significance level of one star (*)? I believe it's mentioned in the paper to be 95% in the text. Could you add this info to the note under the Table?

Answer 2d: One star (*) refers to 95% confident interval. This information has been added under all Tables.

f. For Table 5, the magnitudes in column 2018 are pretty large and more than one (1.166 & 1.117), which is quite counter intuitive why the more well-off households are more likely to face financial hardships than the less well-off households. I wonder whether it's possible that the NHI disproportionately included more poor individuals and that the richer households tend to seek long-term care when facing health conditions, which then cause them to face more financial hardship. Or do you think it's related to the change in out-of-pocket fee between the pre-NHI policies and the NHI, in which the latter subsidizes less, to my understanding.

Answer 2f: We honestly admit that we decide not to go over this issue because those p-value are not statistically significant. The following contents have been added in the manuscript (see manuscript file for more information):

“Regardless of the p-values’ significant levels, more than one income level ORs (1.166 & 1.117) in column 2018 under NHI are because the availability of NHI program encourages more or relatively well-off households to use health service utilization because those households do not reluctant or hesitate to use health service. On the other hand, poorest income household still reluctant to use health service utilization since most of poor household are worrying about non-medical expenditure, which includes transportation cost, food expenditure of both patients and their companies (during hospitalization), and accommodation expenditures (sometimes patients and their family have to stay in individual rooms, which is not covered by NHI due to the huge inflow of patients). As NHI is a new pilot program, not much information about NHI policy has been distributed to poor people who sometimes prefer going to see local private clinics, visiting shamans, and self-prescription. This statement is in tandem with the information provided in table 2 illustrating that there are higher proportions of households income more than 2.5 million LAK (300 USD) and 1 million (120 USD) to 2.5 million LAK (300 USD) in comparison to the poorest income quantile with less than 1 million LAK (120 USD)”
For Table 5 & the data section, how do you define catastrophic expenditure?

Answer 2e: According to the WHO, financial catastrophe refers to a situation where patients are required to pay or co-pay for their health care and their expenditure is greater than, or equal to 40% of non-subsistence income within the household. Recall that information related to health service utilization has been traced back within the period of 1 year. As a result, this information has been added in the manuscript:

“catastrophic expenditure has been estimated by comparing their yearly income and the amount of health service spent in the last 12 months; in which household with health-related expenditure (medical and non-medical expenditure) more than 40% of their income are categorized to be financial catastrophe”

3. Conclusion

a. The conclusion states that the NHI has immensely enhanced financial protection because the income coefficients become insignificant. I believe that more information needs to be provided to claim the "immense" effect of NHI.

Answer 3a: The initial reason that we use the word “immensely” is that after the introduction of the NHI program household at any income level are not suffering from catastrophic expenditure. In contrast, under the CBHI scheme (based on data in 2013 and 2016) households are more likely to experience catastrophic health expenditure at 95% confident interval. We personally admit that the word “immensely” may create misunderstanding for future readers. From this point, we decide to remove the word “immensely” (in both manuscript and abstract) in this part to avoid confusion.

Other changes made in the this revision

Table 1, Additionally explanation has been added in this table as follows (see table 1 for more information):
- **At district hospital, patients already paid 10,000 LAK (1.20 USD) for OPD, if they are transferred to IPD they need to pay an additional amount of 20,000 LAK (2.40 USD); which makes the amount of 30,000 LAK (3.60 USD)
- ***At referral/ provincial hospital, patients already paid 15,000 LAK (1.80 USD) for OPD, if they are transferred to IPD they need to pay an additional amount of 15,000 LAK (1.80 USD); which makes the amount of 30,000 LAK (3.60 USD)

Some typo errors have been corrected