Author’s response to reviews

Title: Alarming prevalence and clustering of modifiable noncommunicable disease risk factors among adults in Bhutan: a nationwide cross-sectional community survey

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Author’s response to reviews:

Dear Editorial team and the reviewers (Dr. Khan and Dr. Jabbour),

Thank you for giving this article your valuable time and for the feedbacks and questions. Which helped this article to become clearer and helpful. I have tried to answer questions from both the reviewers below. I hope it suffices your queries, or else I am willing to clarify more if required.

Reviewer reports:

Md Hasinur Rahaman Khan, Ph.D (Reviewer 1)

The manuscript’s aim is to determine the distribution and clustering of modifiable non-communicable disease risk factors among adults in Bhutan and their demographic and social determinants by using WHO STEPS Survey 2014 data. A weighted analysis is conducted to calculate the prevalence of NCD risk factors, and associations were explored using weighted log-binomial regression models.

1. Why is the study population the adult Bhutanese men and women aged 18-69 only? The less than 18 years people also might suffer from the NCD’s diseases. Need to discuss more why
the study population is chosen as this rather the all Bhutanese men and women excluding the children. Most of the study variables are applicable to all people except the children.

Author’s Response: Thank you very much for pointing this out. This study used secondary data from already collected NCD survey data. The reason why only adult population (18-69 years) was considered for the survey was because the survey was targeted at the adult population as recommended by World Health Organization, which is above 18 years of age. (http://www.who.int/chp/steps/STEPS_Manual.pdf?ua=1)

2. The abbreviation of NCD should come up first in first line of Background rather in the last sentence.

Author’s Response: Thank you and this has been addressed at line no.29 pg.2

3. p10, l70: A weighted analysis is used. What kind of weighted analysis, is it weighted log-binomial regression model? Citation for this is needed.

Author’s Response: Thank you very much for this point. We have done the weighted analysis on the prevalence of the risk factors by adjusting using two auxiliary variables age and sex. This method allows estimates from survey data to be close to the population estimates, it is described in detail at this website http://www.applied-survey-methods.com/weight.html. A citation has been also added in the manuscript at line no 174 pg 9.

4. Why is the weighted log-binomial regression model used rather the adjusted and unadjusted logistic regression models could be used. This kind of model is more understandable and interpretations of the results are more popular. As the data is collected based on multistage cluster sampling the multilevel logistic regression could even be better choice than the logistic regression.

Author’s Response: Thank you very much for this insight. The main reason why we choose to use log-binominal instead of logistic regression is because of high prevalence rate (above 10%) of most of the risk factors (e.g. high salt intake, raised blood pressure, unhealthy diet, overweight, etc.). In such situation using logistic regression over estimated the risk ratios, therefore we decided to go for log-binomial regression in order not to over estimate the risk ratios and also to get prevalence ratios which were much simpler to understand and interpret. Also for the ease of interpretation and to have less confusion we decided to use log-binomial regression for all the risk factors.
5. All the plots of Figure 1 and 2 are not readable; the image quality should be improved.

Author’s Response: Thank you very much for pointing this out. This has been addressed.

6. Need to maintain the consistency in writing references Reference section.

Author’s Response: Thank you very much for pointing this out. This has been addressed at Reference section pg.19

Samer Jabbour, MD, MPH (Reviewer 2):

This is a solid manuscript that is well written and easy to read and follow. It is based on a well-established methodology for NCD surveillance (the STEPS instrument). The work reported is rigorous as it's based on a nationally-representative sample. The analysis is adequate and the reporting is balanced. The manuscript follows a standard approach of most other NCD STEPS reports in that prevalence of risk factors, both behavioral and biological, is presented. This manuscript adds to the already-published report of the Bhutan NCD STEPS survey by reporting associations with socio-demographic characteristics as well as clustering of risk factors.

Some of the findings are astonishing, e.g. high salt intake affecting almost the whole population. To distinguish the manuscript from other NCD STEPS papers, it would be of interest to show the contrast between the findings of this study vs surveys from other countries. All NCD STEPS seem to show high levels of NCD risk factors, clustering of risk factors, and association with sociodemographic variables. Are there special findings that deserve the particular attention of the reader?

Author’s Response: Thank you for the question. This article aims to mainly show other than the high prevalence or risk factors but also how NCD risk factors are clustering in association with socio-demographic variables. Eg. The clustering of more than 3 risk factors 24% more in urban areas compared to the rural areas, and such findings for policy makers to direct their next NCD prevention policies.

I would also like to invite the authors to re-consider their recommendations in the 'Conclusion': Rather than focus on 'lifestyle modification', which places emphasis on people and individual responsibility, perhaps there is a need to consider policy and sociopolitical and economic factors that have undermined global and national progress to address the rise of NCDs and their risk factors in Bhutan as elsewhere.
Author’s Response: Thank you very much for this excellent recommendation. In fact, we fully agree with both the content and even the exact wording of the statement and we decided to revise our Conclusion as follows at line no.57 pg.3 and line no. 363 pg no. 17.

‘The prevalence of modifiable behavioral and biological NCD risk factors was high among Bhutanese adults with a strong tendency of clustering. If a risk factor is identified at the level of the individual or the population, a rigorous assessment of other risk factors has to be made at both the clinical and public health settings. Lifestyle modifications at the population level are urgently required as several risk factors such as high salt intake, unhealthy diet, obesity, and high blood pressure were alarmingly high and frequently clustered. This represents an emerging public health threat to the population, the health system as well as the economy of Bhutan. Moreover there is a need to consider policy and socio-political and economic factors that have undermined global and national progress to address the rise of NCDs and their risk factors in Bhutan as elsewhere.’

Thank you again for your valuables questions and feedbacks. I look forward to hearing from you soon.

Best Regards

Dorji Pelzom