

## 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

<b>TITLE (PROVISIONAL)</b>	Association between socioeconomic status and prevalence of non-communicable diseases risk factors and comorbidities in Bangladesh: Findings from a nationwide cross-sectional survey
<b>AUTHORS</b>	Biswas, Tuhin; Townsend, Nick; Islam, Md.saimul; Islam, Md. Rajibul; Das Gupta, Rajat; Das, Sumon; Mamun, Abdullah

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Mohammadreza Mohebbi Deakin University, Australia
<b>REVIEW RETURNED</b>	20-Sep-2018

<b>GENERAL COMMENTS</b>	<p>This is an important replication study examining prevalence and association of diabetes, hypertension and overweight/obesity with participants demographics and SES using biomarker data in a nationally representative cross-sectional study in Bangladesh. It is a well-written study. My comments are as below:</p> <p>32 non-communicable diseases (NCD) among the adult population in Bangladesh</p> <p>Do not use abbreviation in the title, and be more specific about the diseases and conditions that was explored.</p> <p>Obesity and overweight are not disease, rewording and correction through the manuscript is needed.</p> <p>English and punctuation can be improved.</p> <p>Was dichotomizing age the best to categorize age?</p> <p>Add sampling weight adjusted prevalence and 95% CI into table 2.</p> <p>Add number of people with each condition to table 2, to illustrate there were enough cases in each category for a robust prevalence estimation.</p> <p>Where there enough numbers in groups A-C in all categories of Table 2?</p> <p>Comment about statistical power for performing models 1 to 6.</p> <p>How predictive probability of diabetes, hypertension and BMI (Figure 1) was calculated?</p>
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<b>REVIEWER</b>	Nadrowski, Pawel Medical University of Silesia, Third Department of Cardiology, Katowice, Poland
<b>REVIEW RETURNED</b>	22-Sep-2018

<b>GENERAL COMMENTS</b>	The manuscript entitled "High socioeconomic status associated with greater prevalence of NCD risk factors and co-morbidities in Bangladesh. Findings from a nationwide survey"
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	<p>The topic is of interest, however, there are some important issues regarding the manuscript</p> <p>P3 "The study further assesses factors associated with co-morbidities, in particular socio-economic status" - please clarify/edit, what co-morbidities ?, if you stated phrase "co-morbidities" please provide with basic disease/disease?, is socio-economic status a co-morbidity or factor?</p> <p>Where are obesity related results as obesity is stated in "primary outcome" section?</p> <p>P7 - references 13 and 15 refer mainly to less developed regions like Africa or India, these are contrary to what you provide as "industrialised countries", what's more there is quite a lot of literature form low-income countries , for example :</p> <p>Gamlath L, Nandasena S, Hennadige Padmal de Silva S et al. Differentials in Cardiovascular Risk Factors and Diabetes by Socioeconomic Status and Sex in Kalutara, Sri Lanka. Asia Pac J Public Health 2017; 29(5): 401-410</p> <p>Dinsa GD, Goryakin Y, Fumagalli E, Suhrcke M. Obesity and socioeconomic status in developing countries: a systematic review. Obesity reviews: an official journal of the International Association for the Study of Obesity 2012; 13(11):1067–79.</p> <p>Yusuf S, Rangarajan S, Teo K et al. Cardiovascular Risk and Events in 17 Low-, Middle-, and High-Income Countries. N Engl J Med 2014</p> <p>Many linguistic and stylistic errors in the text, deep revision by english native spekaer would be necessary, some examples just from a few first pages:</p> <p>Title :High socioeconomic status associated with greater - "is associated"</p> <p>P3 "This study aimed to find out prevalence" - to investiagate or examine</p> <p>P3 "Total 8,763 individual" - individuals</p> <p>P3 "Of 8,763 adults, 12% had diabetes (DM)" - DM abbreviation is intoroduced 3 lines above, the same with HTN,</p> <p>P3 - "22%were "</p> <p>P3-4 "Diabetes, hypertension and overweight was more prevalent" - were</p> <p>P4 "amongst "</p> <p>P4 : two versions in text: socioeconomic and socio-economic , please unify , abbreviation for socioeconomic status would be useful, you used SES in the very bottom of the manuscript</p> <p>P4 "Individuals in higher socio-economic status groups were also more likely to suffer from co-morbidity" - co-morbidities, provide what co-morbidities at the introcution or methods section,</p> <p>P4 "individual NCD" - individuals with NCD</p> <p>P4 " higher socio-economic status individuals." - individuals with higher socioeconomic status</p> <p>P4 -obesity in key words - not single result related to obesity in obesity but to overweight, why not HTN,DM or socioeconomic staus provided in key words as well?</p> <p>P5 - "collect of socioeconomic status and biomarker" - collect socioeconomic status and biomarkers , what biomarkers?</p>
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	<p>P6 "often referred to as premature" - without "as"</p> <p>P6 "deaths at these younger ages " - please edit</p> <p>P6 "with this problem....." - please edit</p> <p>P6 "Of increasing concern is the issue of co-morbidity, in which individuals suffer from more than one of the risk factors at a time, with this thought to be highly predictive of end point diseases, disability and death"- unclear ,please edit</p> <p>P6 " co-morbidity of risk factor" ?? what is co-morbidity and what is risk factor in this paper /, it should be explained at the beginning</p> <p>After through revision of the manuscript, in my opinion this manuscript might be considered for publication</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Comment: Do not use abbreviation in the title, and be more specific about the diseases and conditions that was explored.

Response: Thank you for your suggestion. Now we removed it from title. Please see line umber 1-2.

Comment: Obesity and overweight are not disease, rewording and correction through the manuscript is needed.

Response: We consider it as a risk factor

Comment: English and punctuation can be improved.

Response: We reedited English language thoroughly

Comment: Was dichotomizing age the best to categorize age?

Response: Actually, we categorized the age group in two groups, Younger-(35–55 years and older (56 years or older). We did it according to another study conducted in Bangladesh (reference number-23).

Comment: Add sampling weight adjusted prevalence and 95% CI into table 2. Add number of people with each condition to table 2, to illustrate there were enough cases in each category for a robust prevalence estimation. Where there enough numbers in groups A-C in all categories of Table 2?

Response: Thank you for your suggestion. We now revised it according to your suggestion. Please see Table number-2. We also mentioned total cases for each condition in result section. Please see line number 389-391.

Comment: Comment about statistical power for performing models 1 to 6.

Response: We have re-calculated the power to assess whether the existing sample size is enough for performing the multivariable regression models. The variables sex, age, education, occupation are control variables and not of primary research interest. The variable wealth index is our primary interest to assess the association with the joint estimates of NCDs. We have converted the log ( PR) to calculate the effect size by the formula  $d = \log(\text{prevalence ratio}) \times (\sqrt{3/\pi})$ . The primary research

hypothesis was to test the wealth index from poorer to richest groups with the joint estimate of NCDs in the regression equation. We have considered the power .90, level of significance 0.05 , calculated effect size from prevalence ratio and then we get the estimated sample size for each model of each outcomes which covers the existing sample size of our analysis. We have performed the power analysis using G\*Power software

Comment: How predictive probability of diabetes, hypertension and BMI (Figure 1) was calculated?

Response: Thanks to the reviewers. In the figure-1, we have showed the scatter plot between age with blood glucose, systolic blood pressure, diastolic blood pressure and BMI. We have tried to show the average changes of cardiometabolic risk factors against each age point of the participants. We have corrected the sentence in the result sections.

Reviewer: 2

Comment: P3 "The study further assesses factors associated with co-morbidities, in particular socio-economic status" - please clarify/edit, what co-morbidities ?, if you stated phrase "co-morbidities" please provide with basic disease/disease?, is socio-economic status a co-morbidity or factor?

Response: Thank you for your suggestion. We have placed comorbidities instead of co-morbidities and also placed socioeconomic instead of socio-economic.

Comment: Where are obesity related results as obesity is stated in "primary outcome" section?

Response: Our primary outcome was diabetes, hypertension, overweight and all possible comorbidities.

Comment: P7 - references 13 and 15 refer mainly to less developed regions like Africa or India, these are contrary to what you provide as "industrialised countries", what's more there is quite a lot of literature form low-income countries , for example :

Gamlath L, Nandasena S, Hennadige Padmal de Silva S et al. Differentials in Cardiovascular Risk Factors and Diabetes by Socioeconomic Status and Sex in Kalutara, Sri Lanka. *Asia Pac J Public Health* 2017; 29(5): 401-410

Dinsa GD, Goryakin Y, Fumagalli E, Suhrcke M. Obesity and socioeconomic status in developing countries: a systematic review. *Obesity reviews: an official journal of the International Association for the Study of Obesity* 2012; 13(11):1067–79.

Yusuf S, Rangarajan S, Teo K et al. Cardiovascular Risk and Events in 17 Low-, Middle-, and High-Income Countries. *N Engl J Med* 2014

Comment: Thank you for your suggestion. Now we have placed three refences.

Comment: Many linguistic and stylistic errors in the text, deep revision by English native speaker would be necessary, some examples just from a few first pages:

Response: We reedited English language thoroughly

Comment: Title: High socioeconomic status associated with greater - "is associated"

Response: Revised it according to your suggestion. Please see line number 1-2.

Comment: P3 "This study aimed to find out prevalence" - to investigate or examine

Response: Revised it according to your suggestion. Please see line number 37.

Comment: P3 "Total 8,763 individual" – individuals

Response: Revised it please see line number 45.

Comment: P3 "Of 8,763 adults, 12% had diabetes (DM)" - DM abbreviation is introduced 3 lines above, the same with HTN,

Response: Thank you for your suggestion. Now we have made revision please see line number 47-49.

Comment: P3 - "22%were "

Response: Revised it. See line number 51.

Comment: P3-4 "Diabetes, hypertension and overweight was more prevalent " – were

Response: Thank you revised it. Please see line number 54.

Comment:P4 "amongst "

Response: Revised it.

Comment:P4 : two versions in text: socioeconomic and socio-economic , please unify , abbreviation for socioeconomic status would be useful, you used SES in the very bottom of the manuscript

Response: Thank you for your suggestion. We now revised it throughout the manuscript.

Comment:P4 "Individuals in higher socio-economic status groups were also more likely to suffer from co-morbidity" - co-morbidities, provide what co-morbidities at the introduction or methods section,

Response: Thank you for your suggestion. We mentioned it outcome subsection. Please see 147-148.

Comment:P4 "individual NCD" - individuals with NCD

Response: Revised it.

Comment:P4 " higher socio-economic status individuals." - individuals with higher socioeconomic status

Response: Revised it.

Comment:P4 -obesity in key words - not single result related to obesity in obesity but to overweight, why not HTN,DM or socioeconomic status provided in key words as well?

Response: Thank you for your suggestion. We now Revised it.

Comment:P5 - "collect of socioeconomic status and biomarker" - collect socioeconomic status and biomarkers , what biomarkers?

Response: Thank you for your suggestion. Please see line number 131-132.

Comment:P6 "often referred to as premature" - without "as"

Response: Now we revised it.

Comment:P6 "deaths at these younger ages " - please edit

Response: Now we revised it.

Comment:P6 "with this problem....." - please edit

Response: Now we revised it. Please see line number 88-89.

Comment:P6 "Of increasing concern is the issue of co-morbidity, in which individuals suffer from more than one of the risk factors at a time, with this thought to be highly predictive of end point diseases, disability and death"- unclear ,please edit.

Response: Now we revised the whole sentence. Please see line number 97.

P6 " co-morbidity of risk factor" ?? what is co-morbidity and what is risk factor in this paper /, it should be explained at the beginning

Response: Now we revised it. Please see line number 116-117 and 147 -149.

### VERSION 2 – REVIEW

<b>REVIEWER</b>	Nadrowski, Pawel Department of Cardiology, Medical University of silesia, Poland
<b>REVIEW RETURNED</b>	04-Dec-2018

<b>GENERAL COMMENTS</b>	1st Comment - the response doesn't refer to question 2nd Comment - " The primary outcome measures were diabetes ,(DM), hypertension (HTN) and overweight/obesity. "In methods you defined only BMI as $\geq 23\text{kg/m}$ with no overweight or obesity defined. Furthermore in results you use only overweight as outcome
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<b>REVIEWER</b>	Mohammadreza Mohebbi Deakin University, Australia
<b>REVIEW RETURNED</b>	11-Dec-2018

<b>GENERAL COMMENTS</b>	Please add details of power justification into the manuscript in the stats method section explain how predictive probability of diabetes, hypertension and BMI in Figure 1 were estimated Please clarify whether the reported prevalence in Table 2 were calculated using survey weights? The study survey is a nationally representative sample, so I assume survey weights has been produced accordingly?
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### VERSION 2 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 2

1st Comment - the response doesn't refer to question

Response: Thank you for pointing out the mistake. We apologize for the inconvenience. The comment of the honorable reviewer was "P3 "The study further assesses factors associated with co-morbidities, in particular socio-economic status" - please clarify/edit, what co-morbidities ?, if you stated phrase

"co-morbidities" please provide with basic disease/disease?, is socio-economic status a co-morbidity or factor?" Here comorbidities means diabetes (DM), hypertension (HTN) and overweight/obesity. We have now edited the sentences as following "The primary outcome measures were diabetes (DM), hypertension (HTN) and overweight/obesity. The study further assesses factors (in particular socioeconomic status) associated with these comorbidities (DM, HTN and overweight/obesity) ."

2nd Comment - " The primary outcome measures were diabetes ,(DM), hypertension (HTN) and overweight/obesity. "In methods you defined only BMI as

≥23kg/m with no overweight or obesity defined. Furthermore in results you use only overweight as outcome

Response: Thank you! We have revised the manuscript and have mentioned that overweight/obesity is the outcome!

Reviewer: 1

Please add details of power justification into the manuscript

Response: We now added it. Please see line number 154-164.

in the stats method section explain how predictive probability of diabetes, hypertension and BMI in Figure 1 were estimated

Response: Thanks to the reviewers. In the figure-1, we have showed the scatter plot between age with blood glucose, systolic blood pressure, diastolic blood pressure and BMI. We have tried to show the average changes of cardiometabolic risk factors against each age point of the participants. We have corrected the sentence in the result sections.

Please clarify whether the reported prevalence in Table 2 were calculated using survey weights?

The study survey is a nationally representative sample, so I assume survey weights has been produced accordingly?

Response: Yes! The reported prevalence in Table 2 were calculated using survey weights.