

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Malnutrition in all its forms and associated factors affecting the nutritional status of adult rural population in Bangladesh: results from a cross-sectional survey
AUTHORS	Rakhshanda, Shagoofa; Barua, Lingkan; Faruque, Mithila; Banik, Palash; Shawon, R.A; Rahman, AKM; Mashreky, Saidur

VERSION 1 – REVIEW

REVIEWER	Canella, Daniela Institute of Nutrition. Rio de Janeiro State University., Department of Applied Nutrition.
REVIEW RETURNED	19-May-2021

GENERAL COMMENTS	<p>The study assessed the prevalence of malnutrition and its predictors in a rural population of Bangladesh. It is an interesting and relevant study for the public health field. The article is well written, but there are lacks in the report of the Methods section and some points that should be improved or clarified. Other general suggestions were made.</p> <p>It would be interesting to qualify Malnutrition in the text, including in the title. In some parts of the texts, the authors mention the “double burden of malnutrition”. Another term could be “malnutrition in all its forms”. I think it is important to increase the audience of the article since non-experts could interpret the terms as only undernutrition.</p> <p>Abstract. I suggest aligning the objective of the abstract with that presented in the introduction. The study didn't analyse only modifiable risk factors, but also sociodemographic aspects. I also think that the Methods of the abstract should be more informative, including variables considered and the analytical strategies adopted.</p> <p>Strengths and limitations of this study. The aspects pointed out in the last two bullet points, despite they are true, were not investigated in this study. So, the content should be changed.</p> <p>Methods. Hip circumference was not described in the Data collection subsection and I think it should be. Lots of other variables presented in the Results were not presented in the Ascertainment of key variables subsection, being not possible to know how they were collected and their categories, such as Red meat intake, Fried food intake, Processed food</p>
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	<p>intake, Sugary drinks intake, and also Age, Sex, Education, Marital status, Occupation.</p> <p>Data analyses were insufficiently described. What relevant statistical analyses were used? Comparisons were made based on 95% CI?</p> <p>Results.</p> <p>In some countries, men and women present different prevalence of obesity and they present different predictors to nutritional status. Seeing the prevalence presented in table 2, it seems to be true to Bangladesh. So, could be interesting to explore the stratification by sex. Did the authors try that?</p> <p>The results of the multinomial regression were adjusted or table 4 presents crude B and OR? I'm asking this due two reasons: 1) if it's only crude values, the authors opted only by showing significant associations, but it would be interesting to see all of them; 2) considering the influence of sociodemographic variables showed by the authors and in the literature, it's important to adjust the analysis related to behavioral risk factors since part of the relation can be due to the social conditions.</p> <p>Discussion.</p> <p>Page 20 (number presented bottom of the page). Line 41. Replace "undernutrition" with "malnutrition".</p> <p>It would be important to reinforce the importance of study malnutrition in all its forms and investigate its determinants. Despite unhealthy diet is a central problem, aspects related to diet are not the same for under- and over-nutrition and the social determinants are important for both but can have different influences. The impact of social determinants, mainly income, is very clear in reference 6, used before.</p> <p>Strengths.</p> <p>Page 20 (number presented bottom of the page). Line 54. Replace "current burden of malnutrition" with "current double burden of malnutrition".</p> <p>The authors mentioned the census as the sampling technique as a strength. The strategy was a census, but the study could investigate only a third of the individuals, so the results do not represent a census. It should be pointed out in the limitations.</p> <p>Limitations.</p> <p>The fact of some individuals received medication or counseling was mentioned. If this information is available, why not adjust it in the regression model? Or explore the exclusion of individuals with these characteristics in sensibility analysis?</p> <p>Conclusion.</p> <p>Page 22 (number presented bottom of the page). Lines 5-8. The necessity of specific health messages according to the nutritional status was mentioned, but considering the social determinants of malnutrition, probably only health messages will be not enough. It's necessary to have public policies to guarantee access to healthy food. I suggest considering the inclusion of a paragraph discussing this in the Discussion section.</p>
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REVIEWER	Huak, Chan Biostatistics Unit, Yong Loo Lin School of Medicine, National University Health System
REVIEW RETURNED	26-May-2021

GENERAL COMMENTS	<p>Thank you for the article.</p> <p>Minor comments.</p> <ol style="list-style-type: none"> 1. kindly remove the 95% CI from Table 1. instead present the min & max values. 2. the stats para should be better written detailing which software was being used, what was the stats significance set and the stats analyses performed.
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VERSION 1 – AUTHOR RESPONSE

Reviewer 1

1. It would be interesting to qualify Malnutrition in the text, including in the title. In some parts of the texts, the authors mention the “double burden of malnutrition”. Another term could be “malnutrition in all its forms”. I think it is important to increase the audience of the article since non-experts could interpret the terms as only undernutrition.

Ans. Thank you for the suggestion. According to the reviewer’s advice, we have made the changes in the document. The title has been changed to “Malnutrition in all its forms and associated factors affecting the nutritional status of adult rural population in Bangladesh: a cross-sectional survey”. In the text, the term “double burden of malnutrition” has been changed to “malnutrition in all its forms”.

2. Abstract: I suggest aligning the objective of the abstract with that presented in the introduction. The study didn’t analyse only modifiable risk factors, but also sociodemographic aspects. I also think that the Methods of the abstract should be more informative, including variables considered and the analytical strategies adopted.

Ans. Thank you for the suggestion. According to the reviewer’s advice, we have made the changes in the document. Please find the following text in the ‘Method’ Section of the Abstract in lines 31-36 of page 2 (number presented bottom of the page) of the revised document with track change mode.

“The sampling technique was census. Anthropometric measurement, and data on sociodemographic characteristics and behavioral risk factors were collected following the standard protocol described in the WHO STEPS-wise approach. Analysis included means of continuous variables and multinomial logistic regression of factors.”

3. Strengths and limitations of this study: The aspects pointed out in the last two bullet points, despite they are true, were not investigated in this study. So, the content should be changed.

Ans. Thank you for the suggestion. According to the reviewer’s advice, we have made the changes in the document. Please find the following text in the ‘Strengths and limitations of this study Section’ in lines 57-58 of page 3 (number presented bottom of the page) of the revised document with track change mode.

“The study could only investigate a third of the individuals since the community clinics were not attended by everyone who were included in the household survey”

4. Methods: Hip circumference was not described in the Data collection subsection and I think it should be.

Lots of other variables presented in the Results were not presented in the Ascertainment of key variables subsection, being not possible to know how they were collected and their categories, such as Red meat intake, Fried food intake, Processed food intake, Sugary drinks intake, and also Age, Sex, Education, Marital status, Occupation. Data analyses were insufficiently described. What relevant statistical analyses were used? Comparisons were made based on 95% CI?

Ans. Thank you for the suggestion. According to the reviewer's advice, we have made the changes in the document. "Hip circumference" has been added in the last paragraph of the 'Data collection instrument and procedure' Section in line 162 of page 9 (number presented bottom of the page) of the revised document with track change mode.

All of the other variables have been ascertained in the 'Ascertainment of key variables' Section in lines 172-187 of page 10 (number presented bottom of the page) of the revised document with track change mode.

Please find the following text in the 'Data analysis' Section in lines 218-234 of page 12 and 13 (number presented bottom of the page) of the revised document with track change mode.

"To assess the distribution of anthropometric measurements among the respondents, the means of the continuous variables were calculated and presented in a tabulated form with range and standard deviation. A pie chart was used to show the overall nutrition status of the respondents. Descriptive analysis was done to show the distribution of nutritional status and presented as percentage. To identify the sociodemographic and behavioral risk factors affecting malnutrition, multinomial logistic regression analysis was used. In this regards, at first, the assumptions of regression analysis were checked and no violation of these assumptions were found. These assumptions included multicollinearity, outlier, normality, linearity, homoscedasticity, and the independence of observations. Univariate analysis was performed to determine the eligibility of the variables before including them in the multinomial logistic regression analysis. The dependent variable was categorized as underweight, normal weight, overweight and obese. As per literature review, overweight and obesity have similar predictors. As such, overweight and obese were merged together into one category, and normal weight was considered as reference. A P-value of < 0.05 was considered as the cut-off. The regression table for each outcome variable included the presentation of the factors with the corresponding odds ratios (OR) and $OR > 1$ was considered as predictor. The estimates of precision were all presented at a 95% confidence interval (CI), as appropriate."

5. Results: In some countries, men and women present different prevalence of obesity and they present different predictors to nutritional status. Seeing the prevalence presented in table 2, it seems to be true to Bangladesh. So, could be interesting to explore the stratification by sex. Did the authors try that?

The results of the multinomial regression were adjusted or table 4 presents crude B and OR? I'm asking this due two reasons: 1) if it's only crude values, the authors opted only by showing significant associations, but it would be interesting to see all of them; 2) considering the influence of sociodemographic variables showed by the authors and in the literature, it's important to adjust the analysis related to behavioral risk factors since part of the relation can be due to the social conditions.

Ans. Thank you for the suggestion. We have explored the stratification of the results in Table 2 by sex. The distribution of males and females among the respondents are already shown in Table 2. As per our objectives, our dependent variable is nutrition status. We found that stratification by sex may not be additionally informative based on the study objectives. However, based on reviewer's insight,

we are adding this as a Supplementary table in line 597 of pages 34-35 (number presented bottom of the page) of the revised document with track change mode. If the reviewer deems it necessary, then we can add it to the main text. Or else it may remain as a supplementary table.

The analysis of Table 4 was such that the B was unadjusted while the OR (Exponential B) was adjusted.

6. Discussion: Page 20 (number presented bottom of the page). Line 41. Replace “undernutrition” with “malnutrition”.

It would be important to reinforce the importance of study malnutrition in all its forms and investigate its determinants. Despite unhealthy diet is a central problem, aspects related to diet are not the same for under- and over-nutrition and the social determinants are important for both but can have different influences. The impact of social determinants, mainly income, is very clear in reference 6, used before.

Ans. Thank you for the suggestion. According to the reviewer’s advice, we have made the changes in the document. The word has been replaced as suggested by the reviewer. Please find the following text in the ‘Discussion’ Section in lines 323-333 of page 21 (number presented bottom of the page) of the revised document with track change mode.

“This cross-sectional study was undertaken among adult population in a selected rural area. It was a part of an implementation research. The sampling strategy was census, but only a third of the population (those who attended the community clinics) was included in this study, for which reason the result do not represent a census. Several studies have explored the various preconditions and post-effects of all forms of malnutrition mostly with regards to modifiable sociodemographic factors. However, this study attempts to explore the same, but with regards to the status of modifiable lifestyle factors. While adequate knowledge and practices can modify the quality of diet and adjust lifestyles, influence of a combination of economic, social and demographic factors also play a key role in modifying these.⁶ Such complex phenomena may be assessed case by case to determine modification modalities so as to improve the overall health status of a population.”

7. Strengths: Page 20 (number presented bottom of the page). Line 54. Replace “current burden of malnutrition” with “current double burden of malnutrition”.

The authors mentioned the census as the sampling technique as a strength. The strategy was a census, but the study could investigate only a third of the individuals, so the results do not represent a census. It should be pointed out in the limitations.

Ans. Thank you for the suggestion. According to the reviewer’s advice, we have made the changes in the document. Please find the following text in the ‘Limitations’ Section in lines 411-413 of page 25 (number presented bottom of the page) of the revised document with track change mode.

“Although the sampling strategy was census, but the study could only investigate a third of the individuals (those who attended the community clinic). As such, the result do not represent a census.”

8. Limitations: The fact of some individuals received medication or counseling was mentioned. If this information is available, why not adjust it in the regression model? Or explore the exclusion of individuals with these characteristics in sensibility analysis?

Ans. Thank you for the suggestion. There were a few subjects who were previously diagnosed with hypertension or diabetes. We assume that they may have been on medication or may have received some counselling. However, the data/information on this was not available, for which reason it could not be used to adjust it in the regression model.

9. Conclusion: Page 22 (number presented bottom of the page). Lines 5-8. The necessity of specific health messages according to the nutritional status was mentioned, but considering the social determinants of malnutrition, probably only health messages will be not enough. It's necessary to have public policies to guarantee access to healthy food. I suggest considering the inclusion of a paragraph discussing this in the Discussion section.

Ans. Thank you for the suggestion. According to the reviewer's advice, we have made the changes in the document. Please find the following text in the 'Discussion' Section in lines 397-401 of page 24 (number presented bottom of the page) of the revised document with track change mode.

"In addition to increasing health literacy among rural population through training and awareness programs, the Government may also take initiatives to encourage household backyard vegetable and fruits gardening which would help to reduce the overall family. As an initial support, the Government may distribute free (or at nominal price) saplings of fruits and vegetables among rural population."

Reviewer 2

1. Kindly remove the 95% CI from Table 1. Instead present the min & max values.

Ans. Thank you for the suggestion. According to the reviewer's advice, we have made the changes in the document. Please find the modified table with minimum and maximum values in the 'Anthropometric measurements' Section of the Results in this study Section in lines 254-256 of page 14 (number presented bottom of the page) of the revised document with track change mode.

2. The stats para should be better written detailing which software was being used, what was the stats significance set and the stats analyses performed.

Ans. Thank you for the suggestion. According to the reviewer's advice, we have made the changes in the document. Please find the following text in the 'Data analysis' Section in lines 218-234 of page 12 (number presented bottom of the page) of the revised document with track change mode.

"To assess the distribution of anthropometric measurements among the respondents, the means of the continuous variables were calculated and presented in a tabulated form with range and standard deviation. A pie chart was used to show the overall nutrition status of the respondents. Descriptive analysis was done to show the distribution of nutritional status and presented as percentage. To identify the sociodemographic and behavioral risk factors affecting malnutrition, multinomial logistic regression analysis was used. In this regards, at first, the assumptions of regression analysis were checked and no violation of these assumptions were found. These assumptions included multicollinearity, outlier, normality, linearity, homoscedasticity, and the independence of observations. Univariate analysis was performed to determine the eligibility of the variables before including them in the multinomial logistic regression analysis. The dependent variable was categorized as underweight, normal weight, overweight and obese. As per literature review, overweight and obesity have similar predictors. As such, overweight and obese were merged together into one category, and normal weight was considered as reference. A P-value of < 0.05 was considered as the cut-off. The regression table for each outcome variable included the presentation of the factors with the corresponding odds ratios (OR) and OR > 1 was considered as predictor. The estimates of precision were all presented at a 95% confidence interval (CI), as appropriate."

VERSION 2 – REVIEW

REVIEWER	Huak, Chan Biostatistics Unit, Yong Loo Lin School of Medicine, National University Health System
REVIEW RETURNED	01-Sep-2021

GENERAL COMMENTS	Thank you for making the first set of revisions. major comments 1. the software is STATA not SATA 2. the 95% CI reported for categorical variables in Table 2 do not make sense. Kindly present as n(%) 3. stated that Multinomial was performed with only univariate $p < 0.05$ included in the model. what were the variables included in the model? Kindly show final multinomial results (even for $p > 0.05$) with all univariate $p < 0.05$ were included
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VERSION 2 – AUTHOR RESPONSE

Reviewer 2

1. The software is STATA not SATA

Ans. Thank you for noticing the mistake. We have corrected the word in the 'Data analysis' Section in line 203 of page 11 (number presented bottom of the page) of the main document without track change mode.

2. The 95% CI reported for categorical variables in Table 2 do not make sense. Kindly present as n (%)

Ans. Thank you for the suggestion. According to the reviewer's advice, we have made the changes in Table 2 of the document. Please find the changes in the 'Results' Section in lines 288-290 of page 16 (number presented bottom of the page) of the main document without track change mode.

3. Stated that Multinomial was performed with only univariate $p < 0.05$ included in the model. What were the variables included in the model? Kindly show final multinomial results (even for $p > 0.05$) with all univariate $p < 0.05$ were included

Ans. Thank you for the suggestion. According to the reviewer's advice, we have made the changes in Table 4 of the document. Please find the revised table, including final multinomial results even for $p > 0.05$, in the 'Results' Section in lines 311-315 of pages 19-20 (number presented bottom of the page) of the main document without track change mode. We have added the results of univariate analysis as Supplementary table 1. We have further provided a more detailed explanation of the univariate and multivariate analysis. Please find the following text in the 'Data analysis' Section in lines 219-224 of pages 11-12 (number presented bottom of the page) of the main document without track change mode.

"The variables included were age, sex, education, marital status, occupation, physical activity, red meat intake, fried food intake, processed food intake, sugary drink intake, added salt intake, and inadequate intake of fruits and vegetables. During the univariate analysis, only the variables which showed $p < 0.05$ (Supplementary table 1) were considered as eligible to be included in the multinomial logistic regression analysis."

VERSION 3 – REVIEW

REVIEWER	Huak, Chan Biostatistics Unit, Yong Loo Lin School of Medicine, National University Health System
REVIEW RETURNED	11-Oct-2021
GENERAL COMMENTS	Thank you for making the revisions. 1 minor comment. kindly change multinomial logistic regression as multinomial regression