PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Prevalence and correlates of overweight and obesity among adolescents in northeastern China: a cross-sectional study
AUTHORS	Duan, Ruixin; Kou, Changgui; Jie, Jing; bai, wei; Lan, Xiaoxin; Li, Yuanyuan; Yu, Xiao; Zhu, Bo; Yuan, Haibo

VERSION 1 – REVIEW

REVIEWER	Altacilio Nunes Ribeirao Preto Medical School, University of Sao Paulo, Brazil.
REVIEW RETURNED	27-Jan-2020

GENERAL COMMENTS	This article presents the results of a cross-sectional study conducted with adolescents from six schools in a Chinese city. The findings presented are interesting. Below I make some suggestions in order to clarify and improve some points of the text: 1) All text must be revised by someone native to the English language 2) In the abstract, the results containing Odds Ratio and respective 95%CI for multivariate analysis must be included; 3) The entire sampling method must be fully described; 4) In table 1, the chi-square values should be removed and the 95%CI for PR should be included; 5) In tables 2 and 3, the chi-square values (Wald) should be removed.

REVIEWER	Marit Eriksson Futurum - Academy for Health and Care, Region Jönköping County, Jönköping, Sweden
REVIEW RETURNED	10-Feb-2020

GENERAL COMMENTS	Thank you for the opportunity to review this study of prevalence and correlates of overweight and obesity among Chinese adolescents. General comments: The way this study is presented, I think it would be more interesting for a local Chinese audience than for readers of a European-based journal. The majority of the references are Chinese and it assumes that the reader has knowledge about the Chinese geography and economy, which is less likely that readers outside China have. The language needs editing by someone who has English as a first language. There are parts that I don't understand and parts that I possibly misinterpret. Perhaps some of my questions or remarks below are due to misunderstanding.

	Specific comments: Methods section: This section needs to be further developed. There are several things that are missing or not sufficiently described. Study design: I miss a description of when and how the study was carried out, how data was collected and why the exclusion criteria were chosen. How was the cluster sampling done? There are some information under “Data availability”, where it is described that data were collected from a project with a different purpose and there is need for further explanation to understand how the sampling was carried out for this study. It is stated that you “selected a portion of the data in the database”. Why and how did you do the selection? It is also unclear whether this whole procedure might have had any impact on the results or the conclusions drawn. Reporting checklist: The authors have used the SRQR checklist, which is a reporting checklist for qualitative studies. This is however a quantitative observational study and the STROBE checklist for cross-sectional studies should be used. Outcome variables: It is unclear whether the authors have used the IOTFs cut offs for overweight and obesity or the cut offs specifically developed for the Chinese population. The authors say that they used the IOTFs definition, but at the same time that age and sex adjusted BMI≥24 was used as cut off for overweight. There are not any description of which cut off was used for obesity. Please clarify how overweight and obesity were defined. Other variables: I lack a description of how parental overweight, birth history (I’m not sure this is proper wording) and parental educational level was measured and defined. I have some questions about the categorization of the eating habits. I wonder why the categories were chosen and how these could have influenced the results. For example, eating fruits two or more days a week does not seem like a suitable cut off to me for discriminating between good and bad eating habits. Please clarify the rationale behind the chosen cut offs and how these could have influenced the results. I don’t understand the definitions of “picky eater” or "eating with concentration". Please rephrase. The definition of exercise is unclear, please clarify. Statistics: You state that you used “forward stepwise multivariate logistic regression to exclude confounding factors”. What do you mean by exclude confounding factors? You want to include counfounding factors in the analyses to adjust for them. Why did you chose stepwise regression and not theory based regression? Under “Patient and public involvement” you have stated that no patients were involved, but you did involve adolescents from the public. Results section:

	It is stated that individuals with extreme BMI-values were excluded from the study, but it is not described what was considered an extreme value. Please add. You present results of variables that have not been described in the methods section, se above. Please define in the methods section. According to the tables, adolescents who did not eat fruit two times per week or less often had higher prevalence and higher OR of overweight and obesity than those who ate fruit more often. This is intuitively complicated to understand. In the text you state the other way around. Please adjust. Perhaps the ≥ sign is wrong in the tables? I suggest that you only have one decimal in the OR. Three decimals make it look like data are more precise than they are. P 9, r 158. “As for genetic factors, we found that parental weight showed significant improvement in compared with childhood weight.” I don’t understand what this means, please rewrite. P. 13 r 183. You write that “prevalence of overweight would be enhanced if students ate with concentration”, but the OR is 1,387, which suggests the opposite. The other way around is the case for picky eaters in the next sentence. Please adjust. Discussion: The results are mainly being discussed in relation to previous Chinese studies, which of course is highly relevant for a Chinese audience. For an audience outside China, however, it would be interesting to relate the results also to international studies. P15, r 213. “According to the present cross-sectional observation, children who were picky about foods would prefer more fast food, fried food sweet food and so on.” This is not presented in the result section. If these analyses were made they should be presented in the result section. P16, r 237. “…in order to adapt to the small groups in school, students always eat unhealthy food with their peers (34)”. What do you mean by that? You state in the discussion that you interpolated missing values. This is not described in the methods section. Please add how and why you did this in the methods.

VERSION 1 – AUTHOR RESPONSE

Response to Reviewer1

Point 1：All text must be revised by someone native to the English language.

Response: We apologize for the poor language of our manuscript. We have now worked on both language and readability and have also involved native English speakers for language corrections. We really hope that the flow and language level have been substantially improved.

Point 2: In the abstract, the results containing Odds Ratio and respective 95%CI for multivariate analysis must be included.

Response: Thank you for your kind reminding. We have added the OR and 95%CI for multivariate analysis in the abstract.

Point 3: The entire sampling method must be fully described.
Response: Thank you for your kind reminding. We modified the description of the sampling method in in “Subjects” and “Data collection” in page 6, line 95-123. The study sample comprised middle and high school students from six middle schools (three in urban areas and three in rural areas), selected randomly using stratified cluster sampling, in Changchun City, the capital of Jilin Province in Northeast China. Overall, 1955 students aged 11–18 years were included in this cross-sectional survey. The study was carried out by the First Hospital of Jilin University in April 2016. The project was named “Effect and mechanism of weight loss on upper airway collapsibility in obese patients with OSAS” and studied the associations of overweight, obesity and related factors with sleep-related breathing disorders and snoring in adolescents. In this database, we focused on the relevant indicators of overweight and obesity in adolescents and analyzed the risk factors for obesity in adolescents.

Point 4: In table 1, the chi-square values should be removed and the 95%CI for PR should be included
Response: Thank you for your detailed reminding. We have deleted the chi-square values and added the 95%CI for PR in table 1.

Point 5：In tables 2 and 3, the chi-square values (Wald) should be removed
Response: Thanks for your detailed comment. We have deleted the chi-square values in table 2 and table 3.

Response to Reviewer2
Methods section
Point 1: Study design: I miss a description of when and how the study was carried out, how data was collected and why the exclusion criteria were chosen.
Response: Thank you for your detailed comment. We modified the description of the sampling method in in “Subjects” and “Data collection” in page 5-6, line 95-123. The study sample comprised middle and high school students from six middle schools (three in urban areas and three in rural areas), selected randomly using stratified cluster sampling, in Changchun City, the capital of Jilin Province in Northeast China. Overall, 1955 students aged 11–18 years were included in this cross-sectional survey; subjects with overweight/obesity due to known metabolic and endocrine diseases were excluded. Students were also excluded if they had mental or physical impairments severe enough to cause abnormal behaviors, including congenital disease, intellectual disability, and a psychiatric disorder. The study was carried out by the First Hospital of Jilin University in April 2016. The project was named “Effect and mechanism of weight loss on upper airway collapsibility in obese patients with OSAS” and studied the associations of overweight, obesity and related factors with sleep-related breathing disorders and snoring in adolescents. In this database, we focused on the relevant indicators of overweight and obesity in adolescents and analyzed the risk factors for obesity in adolescents.

Point 2: How was the cluster sampling done? There are some information under “Data availability”, where it is described that data were collected from a project with a different purpose and there is need for further explanation to understand how the sampling was carried out for this study. It is stated that you “selected a portion of the data in the database”. Why and how did you do the selection? It is also unclear whether this whole procedure might have had any impact on the results or the conclusions drawn.
Response: Thank you for your detailed comment. We modified the description of the sampling method in in “Subjects” and “Data collection” in page 5-6, line 95-123.

(1)The study was carried out by the First Hospital of Jilin University in April 2016. The study sample comprised middle and high school students from six middle schools (three in urban areas and three in rural areas), selected randomly using stratified cluster sampling, in Changchun City, the capital of Jilin Province in Northeast China. Overall, 1955 students aged 11–18 years were included in this cross-sectional survey.
(2)Original database included questions on demographic characteristics, anthropometric parameters and a pediatric sleep questionnaire - the Sleep-Related Breathing Disorder (PSQ-SRBD). According to several previous studies [12-14] we established inclusion and exclusion criteria and selected a portion of data without affecting our results and conclusions. A study [11] on OSAS and the impact of obesity in adolescents from the database has been published in the International Journal of Environmental Research and Public Health. We focused on the relevant indicators of overweight and obesity in adolescents and analyzed the risk factors for obesity in adolescents in this study.

Point 3: Reporting checklist: The authors have used the SRQR checklist, which is a reporting checklist for qualitative studies. This is however a quantitative observational study and the STROBE checklist for cross-sectional studies should be used.
Response: Thank the reviewer for the kind reminding. We have deleted the SRQR checklist and added the STROBE checklist for the cross-sectional study.

Point 4: Outcome variables: It is unclear whether the authors have used the IOTFs cut offs for overweight and obesity or the cut offs specifically developed for the Chinese population. The authors say that they used the IOTFs definition, but at the same time that age and sex adjusted BMI≥24 was used as cut off for overweight. There are not any description of which cut off was used for obesity. Please clarify how overweight and obesity were defined.
Response: Thank the reviewer for the kind reminding. We have clarified it in our revised manuscript: Weight category was defined using age- and sex- specific BMI cutoff points specifically developed for the Chinese adolescent population. Therefore, BMI values of 24 and 28 were used as cut-off points for overweight and obesity, both for males and females aged 18 years, which were consistent with Chinese adults. (Page 7, line 127-132)

Point 5: Other variables: I lack a description of how parental overweight, birth history (I'm not sure this is proper wording) and parental educational level was measured and defined.
Response: Thank you for pointing out our carelessness. We have added the description and definition of "parental overweight", "birth history" and "parental educational level" in "Key variables" section.
In our study, parental overweight was divided into 2 groups: normal (BMI<24) and overweight or obese (BMI≥24). (Page 7, line 132-133)
Birth history was divided into 3 groups: preterm birth (infants born alive before 37 weeks of pregnancy), full-term birth (infants born alive after 37 completed weeks to less than 42 completed weeks) and post-term birth (infants born alive at 42 completed weeks or after). (Page 7, line 139-142)
Parental educational level was divided into 4 groups: primary school or lower (including those who had never attended school and those with elementary schooling only), junior high school, senior high school (including those with 3 years of secondary vocational schooling) and university or above. (Page 7-8, line 142-146)

Point 6: I have some questions about the categorization of the eating habits. I wonder why the categories were chosen and how these could have influenced the results. For example, eating fruits two or more days a week does not seem like a suitable cut off to me for discriminating between good and bad eating habits. Please clarify the rationale behind the chosen cut offs and how these could have influenced the results.
Response: Thank the reviewer for the detailed comment. We will be happy to edit the text further, based on the helpful comments from the reviewers.
According to Dietary guidelines and the food guide pagoda for Chinese residents, Chinese

adolescents need adequate intake of fish, meat, eggs, milk, beans and vegetables, limit the intake of energy-dense food, including fatty meat, sweets and fried foods. Combined with the contents of the questionnaire, we classified the eating habits. In the Food Guide Pagoda [19], the fruits intake is 200-350 g/d, so we took “eating fruits two or more days a week (350 g/d)” as a cut off. (Page 8, line 146-151)

Point 7: I don’t understand the definitions of “picky eater” or "eating with concentration". Please rephrase.
Response: Thank the reviewer for the kind reminding.
We have changed “picky eater” into “picky eating”. Participants who were classified as “picky eating” were defined as adolescents who had selectivity for a particular kind of food [20]. (Page 8, line 151-152)
We have changed “eating with concentration” into “slowness in eating”. “Slowness in eating” was defined as adolescents with higher masticatory performance and who ate slowly [21]. (Page 8, line 152-154)

Point 8: The definition of exercise is unclear, please clarify.
Response: Thank the reviewer for detailed comment. We have added the definition of “exercise” in highlights. (Page 8, line 154-157)
Groups were formed according to the number of exercise days (aerobic, strength training or both for at least 30 minutes a day), including never (participate in sports ≤1 day per week), sometimes (participate in sports 2-3 days per week) and often (participate in sports ≥4 days per week)

Point 9: Statistics: You state that you used “forward stepwise multivariate logistic regression to exclude confounding factors”. What do you mean by exclude confounding factors? You want to include confounding factors in the analyses to adjust for them. Why did you choose stepwise regression and not theory based regression?
Response: Thank the reviewer for the kind reminding. We used the statistical software SPSS24.0, because we wanted to screen the factors that might be meaningful to us among the factors analyzed, instead of including all the factors strictly, so we used a stepwise regression method to screen the data.

Point 10: Under “Patient and public involvement” you have stated that no patients were involved, but you did involve adolescents from the public.
Response: Thank the reviewer for the kind reminding. The interviewers from the First Hospital of Jilin University helped parents or guardians to complete the questionnaire and provided the data. The adolescents were not involved in the design, recruitment or conduct of the study.

Results section
Point 11: It is stated that individuals with extreme BMI-values were excluded from the study, but it is not described what was considered an extreme value. Please add.
Response: Thank the reviewer for the kind reminding. It was our fault that we did not clearly describe the meaning of the of BMI-values exclusion criteria. In fact, what we wanted to describe was that “The participants with missing BMI values were excluded from the study”. In the data analysis, errors were found in several BMI values. Since the survey was completed, we were unable to verify the source of the data error, so we deleted data with missing BMI values. (Page 10, line 187-189)

Point 12: You present results of variables that have not been described in the methods section, se above. Please define in the methods section.
Response: Thank you for your careful reading and pointing out carelessness. We have added the definitions in the methods section. (Page 7-8, line 126-157)

Point 13: According to the tables, adolescents who did not eat fruit two times per week or less often had higher prevalence and higher OR of overweight and obesity than those who ate fruit more often. This is intuitively complicated to understand. In the text you state the other way around. Please adjust. Perhaps the ≥ sign is wrong in the tables?
Response: Thank you for your careful reading and pointing out carelessness. Adolescents who ate more fruit have higher prevalence and higher OR of overweight and obesity in analysis. We have corrected it to "Participants who ate fruit more than twice a week (OR=1.413, 95% CI: 1.085-1.840) were more likely to be overweight or obese." (Page 14, line 229-231)

Point 14: I suggest that you only have one decimal in the OR. Three decimals make it look like data are more precise than they are.
Response: Thank the reviewer for the kind reminding. We had corrected and have three decimal in the OR in the table2 and table3.

Point 15: P 9, r 158. "As for genetic factors, we found that parental weight showed significant improvement in compared with childhood weight." I don't understand what this means, please rewrite.
Response: Thanks for your detailed comment. We have modified it as "Paternal weight (p =0.018) and maternal weight (p =0.006) also had an effect on the children's weight." (Page 10, line 205-206)

Point 16: P. 13 r 183. You write that "prevalence of overweight would be enhanced if students ate with concentration", but the OR is 1,387, which suggests the opposite. The other way around is the case for picky eaters in the next sentence. Please adjust.
Response: Thank you for your careful reading and pointing out carelessness. We have changed it to "Moreover, the prevalence of overweight was lower in students who ate slowly (OR=1.373, 95% CI: 1.060-1.778). Students who were picky (OR=0.691, 95%CI: 0.528-0.902) were much more likely to be overweight than the subjects who ate a healthy diet." (Page 14, line 231-234)

Discussion
Point 17: The results are mainly being discussed in relation to previous Chinese studies, which of course is highly relevant for a Chinese audience. For an audience outside China, however, it would be interesting to relate the results also to international studies.
Response: Thank you for your king reminding. In the discussion section, we added the related international study results (Page 16, line 258-260; Page 17, line 266-268). Moreover, international comparisons were made on the relationship between parental weight and children's weight (Page 18, line 289-295).

Point 18: P15, r 213. "According to the present cross-sectional observation, children who were picky about foods would prefer more fast food, fried food sweet food and so on." This is not presented in the result section. If these analyses were made they should be presented in the result section.
Response: Thanks for your detailed reminding. Food preference was an independent risk factor for overweight children. In fact, we did not define which foods adolescents have specific preferences for, and we did not specifically classify the variable "picky eating". Therefore, we did not carry out more detailed analysis on the variable of "picky eating" in the analysis. According to the recent reports, children who had a partiality for a particular kind of food would prefer more fast food, snacks, and sugary beverage and fewer fruits and vegetables. Because we reached this conclusion by consulting the literature, we did not write this conclusion in the result analysis. (Page 17, line 273-279)

Point 19: P16, r 237. "…in order to adapt to the small groups in school, students always eat unhealthy food with their peers (34)". What do you mean by that?
Response: Thanks for your detailed reminding. We have deleted this sentence, because this sentence had no meaning in this study.

Point 20: You state in the discussion that you interpolated missing values. This is not described in the methods section. Please add how and why you did this in the methods.
Response: Thanks for your detailed reminding. Since the database was manually collated, some variables in the database had missing values, which resulted in waste and bias of data resources. The missing value was numeric, and the data were approximately normally distributed. The mean interpolation method was adopted in this study. Therefore, we used the "replace missing value" function in SPSS 24.0 and selected the “mean of nearby points” method to interpolate the missing values. (Page 9, line 165-169)

Reference from revised manuscript
11 Ma Y, Peng L, Kou C, et al. Associations of Overweight, Obesity and Related Factors with Sleep-Related Breathing Disorders and Snoring in Adolescents: A Cross-Sectional Survey. International journal of environmental research and public health 2017;14(2) doi: 10.3390/ijerph14020194 [published Online First: 2017/02/18]
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13 Dello Russo M, Ahrens W, De Henauw S, et al. The Impact of Adding Sugars to Milk and Fruit on Adiposity and Diet Quality in Children: A Cross-Sectional and Longitudinal Analysis of the Identification and Prevention of Dietary- and Lifestyle-Induced Health Effects in Children and Infants (IDEFICS) Study. Nutrients 2018;10(10) doi: 10.3390/nu10101350 [published Online First: 2018/09/27]
14 Wang H, Zhai F. Programme and policy options for preventing obesity in China. Obesity Reviews 2013;14(S2):134-40. doi: 10.1111/obr.12106
19 Wang SS, Lay S, Yu HN, et al. Dietary Guidelines for Chinese Residents (2016): comments and comparisons. Journal of Zhejiang University Science B 2016;17(9):649-56. doi: 10.1631/jzus.B1600341 [published Online First: 2016/09/09]
20 Antoniou EE, Roefs A, Kremers SP, et al. Picky eating and child weight status development: a longitudinal study. Journal of human nutrition and dietetics : the official journal of the British Dietetic Association 2016;29(3):298-307. doi: 10.1111/jhn.12322 [published Online First: 2015/05/20]
21 Oberle MM, Romero Willson S, Gross AC, et al. Relationships among Child Eating Behaviors and Household Food Insecurity in Youth with Obesity. Childhood obesity (Print) 2019;15(5):298-305. doi: 10.1089/chi.2018.0333 [published Online First: 2019/05/16]

VERSION 2 – REVIEW

REVIEWER	Altacilio Nunes Ribeirao Preto Medical School, University of Sao Paulo - Brazil
REVIEW RETURNED	31-Mar-2020

GENERAL COMMENTS	After the initial review, the article improved the quality, however many points still need to be reviewed. Here are some suggestions: 1) In the abstract, it is necessary to make clear the results of the multivariate analysis, for example: Which sex was associated with obesity / overweight? Which category of consumption (too little or too much) of fruit was associated with obesity / overweight? What "parental weight" was associated with obesity / overweight (normal, overweight or obesity? The same for the mother's weight! 2) In the methods, make it clear that this was a cross-sectional study.

	There is no mention of approval by the Institutional Research Ethics Committee. Please clarify that. On page 35 (line 109) of the revised version, the correct word is STROBE. Please correct. 3) In the results as well as in the abstract, the results of association estimators (PR and OR) and respective 95%CI must contain only 1 or 2 decimal places after the index. Review the analysis where the highest consumption of fruit appears as an exposure factor for obesity (this is strange and does not make biological sense, it is inconsistent and inconsistent with the global data). 4) In the discussion, thoroughly discuss the result of the association of increased consumption of fruits and obesity / overweight (seek biological plausibility for this). Make it very clear what the limitations of this study are.

REVIEWER	Marit Eriksson Futurum - Academy for Health and Care, Region Jönköping County, Jönköping, Sweden
REVIEW RETURNED	08-Apr-2020

GENERAL COMMENTS	Thank you for the opportunity to read this revised manuscript. The authors have answered all my questions and made the suggested changes, except for the number of decimals presented. The language and the manuscript have been substantially improved. Well done! The only thing that still is confusing is the statement “Moreover, the prevalence of overweight was lower in students who ate slowly (OR=1.373, 95% CI: 1.060-1.778). Students who were picky (OR=0.691, 95%CI: 0.528-0.902) were much more likely to be overweight than the subjects who ate a healthy diet.” The text says that students who ate slowly had lower prevalence of overweight, and students that were picky were more likely to be overweight, but the OR:s suggest the opposite. The results of the analyses are that students who were not picky were less likely to be overweight (OR=0.69…) etc., are they not? It’s because you have “yes” as the reference category in your analyses, which is clear in the table, but you need to rephrase the text or change reference category. Please clarify this.

VERSION 2 – AUTHOR RESPONSE

Response to Reviewer1

Point 1: In the abstract, it is necessary to make clear the results of the multivariate analysis, for example: Which sex was associated with obesity / overweight? Which category of consumption (too little or too much) of fruit was associated with obesity / overweight? What "parental weight" was associated with obesity / overweight (normal, overweight or obesity? The same for the mother's weight!

Response: We really appreciate your constructive advice and giving us helpful methods of modification. We have made the following supplements according to your suggestions:

Multivariate logistic regression showed that overweight and obesity were significantly associated with male (OR=1.91, 95% CI: 1.48-2.47), fresh fruits two or more days per week (OR=1.41, 95% CI: 1.09-1.84), eating quickly (OR=1.37, 95% CI: 1.06-1.78). The students who were not picky (OR=0.69, 95% CI: 0.53-0.90) were less likely to be overweight. And adolescents whose father were overweight or

obese (OR=0.67, 95% CI: 0.52-0.86) or mother were overweight or obese (OR=0.72, 95% CI: 0.52-0.99) were less likely to be overweight. (Page 2, line 35-41)

Point 2: In the methods, make it clear that this was a cross-sectional study. There is no mention of approval by the Institutional Research Ethics Committee. Please clarify that. On page 35 (line 109) of the revised version, the correct word is STROBE. Please correct.
Response: Thank the reviewer for the kind reminding. We have explained the questions below:
(1) In the "Subject" section, we have described it as "A cross-sectional survey was conducted in Changchun City, the capital of Jilin Province in Northeast China. The study sample comprised middle and high school students from six middle schools (three in urban areas and three in rural areas), selected randomly using stratified cluster sampling." in page 5, line 97-100.
(2) We added the ethics approval in the "Data collection" section in methods in page 6, line 107-110. "The study was approved by the ethics committee of the First Hospital of Jilin University (Reference Number: 2013-031). The investigation received informed consent from students and parents."
(3) Thank you for pointing out our carelessness. We have corrected the word "STROBE" in the revised manuscript in page 6, line 104-105.

Point 3: In the results as well as in the abstract, the results of association estimators (PR and OR) and respective 95%CI must contain only 1 or 2 decimal places after the index. Review the analysis where the highest consumption of fruit appears as an exposure factor for obesity (this is strange and does not make biological sense, it is inconsistent and inconsistent with the global data).
Response:
(1) Thank you for your detailed comment. We have corrected the decimal places of PR, OR and 95%CI in the abstract and results.
(2) We have reviewed the analysis and checked again and we corrected an error data in "Table 2" Univariate analysis: the frequency of fast food consumption (P=0.16, OR=1.08, 95%CI: 0.97-1.19) and we changed it to the frequency of fast food consumption (P=0.135, OR=1.32, 95%CI: 0.92-1.91). The variables of "P<0.10" were included in the forward stepwise multivariate logistic regression analysis, and there were no changes in the results.
We speculate that this result may be caused by the following two reasons:
Firstly, the data were recalled by parents or guardians and there might be information bias in the process of analysis. Secondly, adolescents generally do not eat fruit as a meal replacement. It is reasonable to assume that teenagers eat too much fruit when they are full, and that they do not exercise enough to burn off the excess sugar, therefore the fructose in fruit is stored in the body as fat. We have explained this in the in the "Discussion" section and we have written it as a limitation. However, there are still some shortcomings. We agree that this conclusion is not consistent with most of the research results, and we still need to do more investigation and further research on this conclusion, respectively.

Point 4: In the discussion, thoroughly discuss the result of the association of increased consumption of fruits and obesity / overweight (seek biological plausibility for this). Make it very clear what the limitations of this study are.
Response: Thank you for your kind reminding. We have discussed further in the "Discussion" section in the following:
(1)Fructose, which is ubiquitous found in fruit and sugar-sweetened beverages, is one of the factors contributing to rising obesity rates [39, 40]. High intakes of fructose may decrease the abundance of the bacterial species Eubacterium eligens, reduce metabolism of monosaccharide and lose the ability to consume large amounts of fat [41]. The fructose intake threshold of adolescents is currently average 75g/d. If teenagers get too much fructose without consuming glycogen in time, fructose will be converted into fat at a higher rate [42, 43]. Based on the results of our study, it was reasonable to speculate that the children were already full in addition to the excessive intake of fruits with high sugar content. However, the heavy study demand in China makes the children fail to consume the extra

energy through exercise, thus leading to the possibility of being overweight. Further research should be conducted to validate the conclusion. (Page 17, line 267-278)
(2)We have modified the limitations in the “Discussion” section in Page 19, line 310-316.
However, some potential limitations exist in this cross-sectional study. The contents of the questionnaire were most recalled by the parents or guardians and there might be information bias in this survey. In addition, we set the classification standard of eating fruit frequency as "eating fruit 2 days a week" combined with the questionnaire data recalled by the parents or guardians, which may not be appropriate, so different results could have been obtained. Further research should be conducted to validate the conclusion.

References

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Response to Reviewer2

Point 1: The only thing that still is confusing is the statement “Moreover, the prevalence of overweight was lower in students who ate slowly (OR=1.373, 95% CI: 1.060-1.778). Students who were picky (OR=0.691, 95%CI: 0.528-0.902) were much more likely to be overweight than the subjects who ate a healthy diet.” The text says that students who ate slowly had lower prevalence of overweight, and students that were picky were more likely to be overweight, but the ORs suggest the opposite. The results of the analyses are that students who were not picky were less likely to be overweight (OR=0.69…) etc., are they not? It’s because you have “yes” as the reference category in your analyses, which is clear in the table, but you need to rephrase the text or change reference category. Please clarify this.
Response: We really appreciate your constructive advice and giving us helpful demonstration sentences. We have made the following supplements according to your suggestions:
Moreover, the prevalence of overweight was higher in students who ate quickly (OR=1.37, 95% CI: 1.06-1.78) than those who ate slowly. Students who were not picky (OR=0.69, 95%CI: 0.53-0.90) were less likely to be overweight than the subjects who ate a healthy diet. (Page 14-15, line 230-234)

VERSION 3 – REVIEW

REVIEWER	Altacilio Nunes Ribeirao Preto Medical School, University of Sao Paulo, Brazil
REVIEW RETURNED	07-May-2020

GENERAL COMMENTS	Okay.

REVIEWER	Marit Eriksson

	Futurum - Academy for Health and Care, Region Jönköping County, Jönköping, Sweden
REVIEW RETURNED	05-May-2020

GENERAL COMMENTS	Abstract, line 36: It should be "...associated with male sex" or "...being male" and "..eating fresh fruit..." Key variables, line 138-140: The classification of sleep is not exclusive. You could sleep less than 8 hours 3 days a week and more than 10 hours 3 days a week. Clarify how the classification was done. Results, line 204-206: You write that student's different eating habits had significant differences in overweight. Please state if overweight was more or less prevalent if you ate fruit less than twice a week etc. Results, line 212: write underweight/normal weight and overweight/obese to discriminate the groups. Results, line 232-234: You write that picky eaters were less likely to be overweight than subjects who ate a healthy diet. It should be "…than who are not picky eaters". You don't necessarily have a healthy diet if you are not a picky eater. Discussion, line 267-273: I question whether this is a plausible explanation for the higher OR of overweight among those who ate more fruit in this study, where the high fruit intake is as low as 2 days per week or more often. Could there be any other explanation for your results? Misclassification? Discussion, line 279: You have a reference to the present study. Is it misplaced? Discussion, line 289-290: You state that overweight students preferred more sweet foods and take-out food than normal weight counterparts, but you did not present that in the results. Or is that not your study? Please clarify.

VERSION 3 – AUTHOR RESPONSE

Response to Reviewer 2

Point 1: Abstract, line 36: It should be "...associated with male sex" or "...being male" and "...eating fresh fruit..."
Response: Thank the reviewer for the detailed comment. We have modified the abstract as "associated with male sex" and "eating fresh fruits more than two days per week". (Page 2, line 36-37)

Point 2: Key variables, line 138-140: The classification of sleep is not exclusive. You could sleep less than 8 hours 3 days a week and more than 10 hours 3 days a week. Clarify how the classification was done.
Response: Thank the reviewer for the detailed comment. We have changed the classification of sleep to "Participants who slept less than 8 hours over 3 days a week were classified as 'sleep <8 h', and those who slept more than 10 hours over 3 days a week were defined as 'sleep >10 h'[17]." (Page 7, line 138-140)

Point 3: Results, line 204-206: You write that student's different eating habits had significant differences in overweight. Please state if overweight was more or less prevalent if you ate fruit less than twice a week etc.
Response: Thank you for your kind reminding. In table 1, we listed the prevalence of different eating habits and we added the description as “In addition, students who ate fruits more than twice a week (P =0.029), ate slowly (P =0.004), and were picky (P =0.028) had a higher prevalence of overweight in the study.” (Page 11, line 205-207)

Point 4: Results, line 212: write underweight/normal weight and overweight/obese to discriminate the groups.
Response: Thank you for your kind reminding. We have changed the “underweight and normal and overweight and obese” to “underweight/normal weight and overweight/obese”. (Page 12, line 213)

Point 5: Results, line 232-234: You write that picky eaters were less likely to be overweight than subjects who ate a healthy diet. It should be “…than who are not picky eaters”. You don't necessarily have a healthy diet if you are not a picky eater.
Response: Thank you for your suggestion. The original sentence was “Students who were not picky (OR=0.69, 95%CI: 0.53-0.90) were less likely to be overweight than the subjects who ate a healthy diet.” We modified the result as “Compared with picky eaters, students who were not picky (OR=0.69, 95%CI: 0.53-0.90) were less likely to be overweight.” (Page 15, line 233-234)

Point 6 : Discussion, line 267-273: I question whether this is a plausible explanation for the higher OR of overweight among those who ate more fruit in this study, where the high fruit intake is as low as 2 days per week or more often. Could there be any other explanation for your results? Misclassification?
Response: Thank you for your kind suggestion. We have added the following explanation:
Moreover, the heavy study demand in China makes the children fail to consume the extra energy through exercise, thus leading to the possibility of being overweight. For obese children, their parents believe they can control their weight by increasing their fruit intake. This may also have contributed to the fact that the children in our cross-sectional study who ate more fruit were more likely to be overweight. However, given our inconsistent results with previous finding [37, 38], whether the reason is due to different classification needs further research. (Page 17-18, line 275-282)
We also mentioned this in our limitation section:
In addition, we set the classification standard of eating fruit frequency as "eating fruit 2 days a week" combined with the questionnaire data recalled by the parents or guardians, which may not be appropriate. Further studies considering different classification and a quantitative measurement are required.（Page 19, line 316-319）

Point 7: Discussion, line 279: You have a reference to the present study. Is it misplaced?
Response: Thank you for your kind reminding. We have changed it to “According to a recent study…” (Page 18, line 283)

Point 8: Discussion, line 289-290: You state that overweight students preferred more sweet foods and take-out food than normal weight counterparts, but you did not present that in the results. Or is that not your study? Please clarify.
Response: Thank you for your kind reminding. Actually, we did not get the result of “overweight students preferred more sweet foods and take-out food” in our analysis and it was based on a recent study we mentioned as [47]. We have modified the sentence to “According to a previous study in Tianjin [47], overweight students preferred significantly more sweet foods and take-out food than their counterparts with normal weight.” (Page 17, line 292-294)

Reference

[17] Wang R, Zhang P, Gao C, et al. Prevalence of overweight and obesity and some associated factors among adult residents of northeast China: a cross-sectional study. BMJ open 2016; 6(7):e010828. doi: 10.1136/bmjopen-2015-010828 [published Online First: 2016/07/28]

[37] You J, Choo J. Adolescent Overweight and Obesity: Links to Socioeconomic Status and Fruit and Vegetable Intakes. International journal of environmental research and public health 2016; 13(3) doi: 10.3390/ijerph13030307 [published Online First: 2016/03/24]

[38] Tohill BC, Seymour J, Serdula M, et al. What epidemiologic studies tell us about the relationship between fruit and vegetable consumption and body weight. Nutrition reviews 2004; 62(10):365-74. doi: 10.1111/j.1753-4887.2004.tb00007.x [published Online First: 2004/10/29]

[47] Andegiorgish AK, Wang J, Zhang X, et al. Prevalence of overweight, obesity, and associated risk factors among school children and adolescents in Tianjin, China. European journal of pediatrics 2012; 171(4):697-703. doi: 10.1007/s00431-011-1636-x [published Online First: 2011/12/14]