Author's response to reviews

Title: The burden of underweight and overweight malnutrition among women in Addis Ababa, Ethiopia

Authors:

Yibeltal Tebekaw Mr (ytebekaw@gmail.com)
Charles Teller Prof. (profcharlesteller@gmail.com)
Uriyoán Colón-Ramos Assi. Prof. (uriyoan@gwu.edu)

Version: 2 Date: 16 September 2014

Author's response to reviews: see over
Authors’ responses for reviews

Title: The burden of underweight and overweight among women in Addis Ababa, Ethiopia

Dear Editor

Attached please find our revisions and point by point responses to the reviewers’ comments. With the submission of this revised manuscript we would like to acknowledge the comments forwarded by the Referees and we also appreciate for taking part of their busy time to review our article. We have fully considered all of the comments and observations suggested by the reviewers and have made major revisions to the manuscript. The comments have helped us to see the article with more depth and make adjustments accordingly. Please let us know if any more is needed from our end to improve the content of the article.

Thank you for your consideration.

Sincerely,

Yibeltal T. Bayou
Corresponding author
ytebekaw@gmail.com
Reviewer: Hélène Delisle

General comments:

This is an interesting paper as it addresses the double burden of underweight and overweight, a little documented phenomenon so far which results from a rapid nutrition transition in low-income countries. Although it is primarily descriptive, the study suggests that in low-income countries such as Ethiopia, overweight/obesity is increasing much faster than underweight is declining in women, which is a real health issue. The discussion, however, would require strengthening and the conclusion would have to be clearer.

Specific comments:

1. The title does not describe the content of the paper very well. Why not ‘The double burden of underweight and overweight in Ethiopian women’.

Answer: Thank you for this suggestion. The authors have considered it and the title reads as: “The burden of underweight and overweight among women in Addis Ababa, Ethiopia”.

2. In the abstract, the 43% increase in urban obesity among women appears dramatic unless the (low) prevalence rates are also given (3.0%, 4.3%).

Answer: This has been revised and it reads “…from 3.0% to 4.3%” in the abstract.

3. The conclusion is far from clear in the abstract. Among others, it is not the ‘nutrition transition of the double burden’ but rather the nutrition transition which explains the double burden.

Answer: We agree on this comment and the conclusion has been modified and focused.

“Finally, the co-existence of underweight and overweight/obesity in women of both lower and higher socioeconomic groups, despite the fast economic growth in Ethiopia signals the need for further studies focusing on the impact of the socio-economic and demographic transition on the nutrition transition in the country.”

4. It is not clear why the wealth index was not used, which is unfortunate. Even if all study participants were in the highest category, differences in the score may be of interest.

Answer: Based on the reviewer’s suggestion, we used the wealth index factor scores to regroup the study population into the wealth quintile. This allowed us to compare variations across the different categories. Detail included under the “Independent variables” section. It reads:

“....we used the wealth index factor scores developed using the principal component analysis method to regroup the study population into the wealth quintile specific to Addis Ababa. In the
grouping of the wealth status, after obtaining the wealth quintiles, the 815 and 1648 sample size for 2005 and 2011 EDHS data were classified into five categories of approximately equal numbers ranging from the least advantaged (first quartile or lowest class) to the most advantaged (fifth quintile highest class). Wealth index was not included in the 2000 EDHS.”

5. How can exposure to media be qualified as ‘satisfactory’ or ‘unsatisfactory’? Satisfactory if the respondent uses one media at least once a week? Less judgmental labels are recommended.

Answer: We agree on this important comment and in the revised version of the article exposure to media was used as follows. The categorization is less judgmental in this version.

“Exposure to media was assessed in terms of exposure to newspaper/magazine and television. Hence, each of these variables was categorized as yes if the respondent reads newspaper/magazine or watches television regardless of the frequency; as no if the respondent doesn’t read newspaper/magazine or does not watch television at all.”

6. Only 20% of subjects provided valid information on partner’s educational status and on place of delivery, which is extremely low and requires a caveat in the discussion.

Answer: We agree with the reviewer and these variables were not used in the analysis. This was explained under the Methods section.

“Variables including women’s decision-making autonomy on own healthcare, large household purchases and visits to relatives, partner’s educational status antenatal visit and place of delivery were excluded from the analyses for having large (50-80%) missing values.”

7. Not only binary, but multiple logistic regression models were constructed.

Answer: This has been revised. The sentence now reads:

“Multivariate logistic regression models were fitted for each outcome for each one of the EDHS data (six in total for years 2000, 2005, and 2011.”

8. Table 2: Why there are missing data in several places should be explained.

In fact, in our analysis data, there are no several missing data. Where there are missing values, variables haven’t been included in the analysis. See the “Answer” for the above (#6) question.

9. The authors do not describe and discuss some changes over time in the association of some determinants with outcomes. For instance, it is emphasized that higher education was associated with significantly higher likelihood of overweight/obesity. However, looking at Table 2, we note: 1) no data are available on education and underweight except in 2011; 2) in 2011, education level is significantly associated with neither underweight nor overweight. Regarding overweight/obesity, only age and education were significant (and only in 2000 and 2005). Therefore, some of the statements should be attenuated.
Answer: Text has been clarified and detailed below. The data are also included under table 2.

“The association between educational status and risk of underweight is worth further discussion. According to our results, women with higher educational attainment were more likely to be underweight compared to those with no formal education in 2011. The 2005 and 2011 EDHS reports show that the percentage of underweight women among those with primary level of education was higher than those with no formal education [33, 34]. On the other hand, educational status and BMI levels associated positively in all the models. However, the strengths of associations show a steady decline from 2000 to 2011. Women with secondary and above-level of education were 2.36, 1.95 and 1.35 times more likely to be overweight/obesity but in 2011 the strength of association was not statistically significant. A recent study in Ghana also showed no association between educational status and overweight/obesity [44]. Many studies have documented the direct relationship between educational status and overweight obesity [9, 16, 45, 46]. However, in other countries including China and other moderate income countries like Brazil and Mexico, adults with low educational status are more likely to be overweight [2, 8]. A study from Poland shows that less educated women tend to have higher BMI levels compared to those better educated ones [47]. A study done among urban areas of Ghanian and South Africa showed no significant association between education and overweight/obesity [44, 48]. Examining the cause of variations in the impact of educational status on BMI levels of women in different urban areas is beyond the scope of this study.”

10. In the discussion, the issue of BMI cut-offs associated with increased health risk in various population groups should be brought up. There has been a great deal of discussion in several papers showing that the best survival was observed in the BMI range of overweight. However, a recent paper dismisses this, although in an Australian population (Joshy H et al, 2014).

The reviewer offers an interesting point. However, in our paper, we are not concerned with BMI associations with mortality, but rather we seek to describe BMI prevalence and its socio-demographic correlates. We are interested in comparing BMI prevalence of our results to those previously published. Therefore, we use the established cut-off points for BMI so that our results are comparable to those of other published studies.

11. The absence of data on cardiometabolic risk factors and on behaviours and lifestyles is a major limitation of the study, to be mentioned along the low rate of valid data. A paper by Zeba A et al in Burkina Faso investigated the ‘double burden of malnutrition’ in adults in connection with the nutrition transition and examined biological and biochemical correlated: Zeba A et al 2012.

Answer: Done. “….The data also lacks variables on cardio-metabolic factors, behaviours and lifestyles…..”

12. Poor access to drinking water may be regarded as an indicator of low socio-economic status and this should be mentioned.
“Among those variables suggestive of socioeconomic status besides education and wealth status [26], access to improved source of water and improved toilet facilities negatively associated with underweight status...”

13. On P. 2, line 4, hypertension is repeated twice. It should read diabetes.

Answer: Corrected.

14. The first time an abbreviation in used, it has to be defined (see SSA on p. 3; ICF on p.5).

Answer: Corrected

15. P. 4, paragraph before last: last 2 sentences should be moved with the objectives paragraph on p. 5.

Answer: Corrected

16. P. 10: a ‘visible’ difference: not scientific. It is either statistically significant or there is a trend.

Answer: Corrected. The sentence reads as “The occurrence of overweight/obesity also showed statistically significant difference between those who watch television (21.5%) and those who do not (9.0%).”

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests: No competing interest to declare

Referee 2:

Reviewer: Olufunke Alaba

General comments:

The paper addresses a relevant issue associated with increasing prevalence of obesity in a developing country, Ethiopia. It examined the rising overweight/obesity and under-nutrition rates among adult females and its socio-demographic correlates in Addis Ababa, Ethiopia using the Ethiopian Demographic health survey of 2000, 2005 and 2011. I believe that this is an important and understudied issue in developing countries and the manuscript would be of policy relevance if the authors could address the following:

Compulsory revisions:
1. The title: the title is currently misleading. The paper is actually looked at adult female overweight-obesity and under-nutrition in Addis Ababa as indicated in the abstract, I will suggest the author recast the title to reflect the actual issues addressed by the paper.

Answer: Modified accordingly as “The burden of underweight and overweight among women in Addis Ababa, Ethiopia”

2. The Introduction: the emphasis and the discussion in the introduction is on obesity alone, the section, therefore needs revision to ensure a flow and alignment with the objectives.

Answer: The background section is well balanced in the revised section:

“Low-income countries have historically been burdened with high levels of undernutrition (stunting, wasting and underweight) and infectious diseases [1, 2]. More than 3.5 million mothers and children under-five die annually due to the underlying cause of undernutrition, and millions more are permanently disabled physically and mentally as a result of poor dietary intake in the earliest months of life [3]. Women who are underweight prior to pregnancy and who gain little weight during pregnancy are at increased risk of complications and death [1, 3]. Malnourished mothers are more likely to give birth to low birth-weight babies who face a greatly increased risk of dying in infancy. In Africa all levels of underweight i.e., mild, moderate and severe underweight, are highly prevalent [4, 5].

Despite this high prevalence in underweight, low income countries are also faced with increasing rates of overweight and obesity, particularly in urban areas [2, 6, 7]. The demographic and epidemiological transitions in low income countries have been accompanied by increasing rates of urbanization, overweight and obesity and non-communicable diseases (NCD) [1-4, 8-9]. Urbanization brings about increases in consumption of refined sugars and animal fats, usually coupled with a more sedentary lifestyle; all of which promote obesity [10, 11]. Between 1980 and 2008, mean body mass index (BMI) globally increased on average by 0.4gk/m$^2$ per decade [12]. Now a days, overweight/obesity and underweight co-exist in the same community or family in low income countries [1, 13]. The rates are increasing at alarming rates in Sub-Saharan Africa, [14] where as much as 20-50% of urban populations are estimated to be overweight or obese [15-17].

This rise represents a challenge for the health care system, which is traditionally overburdened by underweight problems arising from famine, food insecurity and infectious diseases [18], but now has to cope with obesity-related NCDs which are estimated to account for 46% of all deaths by 2030 [19].

The growing problem of obesity presents a challenge for public healthcare systems in low- and middle-income countries. The healthcare systems in these countries traditionally operate by devoting resources to problems of underweight and infectious diseases, but as these countries experience increased economic development and urbanization, the healthcare systems must also learn to manage nutrition-related non-communicable diseases (NCD) [20]. Urbanization
brings about increases in consumption of refined sugars and animal fats, usually coupled with a more sedentary lifestyle; all of which promote obesity [10-11].

Addis Ababa is an ideal setting to describe the coexisting rates of under and overnutrition. Addis Ababa is the capital and largest urban area of Ethiopia, a country that has been largely burdened by famine, food insecurity and underweight [21]. However, today NCD including cardiovascular diseases and diabetes are the leading causes of death among adults [22]. About 31% of deaths reported from hospitals in Addis Ababa were attributed to NCD including diabetes mellitus and cardiovascular diseases [23]. The prevalence of hypertension is very high nearly 20% and 15% among healthy working men and women respectively. The obesity and overweight rates in the city are comparable to those reported in other urban areas of the SSA region, where 25.7% of women were overweight and 10.2% were obese [24], and 25% of adolescents in school were obese [25]. The trends in the increase of obesity rates have not yet been documented for this capital, and there is scarce information about the determinants of overweight. This can be important information to help elucidate targeting strategies to deal with the coexisting underweight and overweight problems.”

3. Review of Literature: The authors included some uncommon variables in the analyses like parity and religion. I will suggest that the authors include a conceptual or theoretical literature that will explain the rationale behind all the chosen variables and a prior association of the correlates to obesity and under-nutrition. For instance, why should parity and religion be an important factor to consider when investigating overweight-obesity or under-nutrition prevalence?

Answer: We have added literature review on the background and Methods section on this regard. The following is added under background section:

“We draw from United Nations Children’s Fund (UNICEF’s) nutrition conceptual framework to identify potential correlates of nutritional status (overweight and underweight) [26]. The framework highlights that immediate causes of nutritional status are diet intake and health status. The underlying causes of diet intake and health status in turn rest on three pillars: (1) household food security (i.e. income to buy food, access to foods); (2) maternal and caregiver practices (i.e. maternal education, inadequate or inappropriate information or education breastfeeding practices, etc.) and (3) health services and the environment (i.e., access to maternal healthcare services, exposure to media (which has been associated with being sedentary [10-11], dwelling characteristics, access to water and sanitation). These underlying causes are in turn determined by basic societal causes including cultural or socio-political characteristics that may be dictated by ethnicity, or religion, working and marital status, woman’s relationship to head of household) and economic structures (i.e. wealth or socioeconomic status) that may shape resources and behaviours [26]. Evidences show that weight gain increases with parity i.e., especially in urban areas lower parity are more likely to have lower BMI levels [27]. In Ethiopia, health and religious beliefs have strong link [28, 29]. An in-depth analysis also shows that Muslim women show better decision making power on their own health care as compared to other religious groups [30]. Another study shows that in Ethiopia, women’s decision-making autonomy has positive effect on their nutritional status [31].”
4. The methods: the authors indicated that ‘in the survey, nutritional status of children and women was determined through anthropometry ...’ this is confusing because there are different anthropometric measures. The authors should mention available anthropometric measures in the literature and indicate the ones they used.

Answer: Corrected accordingly. “…height and weight measurements were carried out on women aged 15-49 years”.

   a. It is very important for the authors to indicate whether the collection of the anthropometry data are self-reported or objectively measured. Self-reported weight and height data are subject to reporting bias and usually have implication(s) on under or over estimation of figures. If this wasn’t corrected for in the analysis then the authors should at least acknowledge and briefly discuss this effect as a limitation.

Answer: Height and weight were measured by EDHS surveyors (indicated).

   b. It is important for the authors to indicate how the sampling structure of the data was handled in their analysis, given that the EDHS employed a two-stage cluster sampling technique.

Answer: The following is included in the revised version.

“Due to the non-proportional allocation of the sample to the different regions and to their urban and rural areas, EDHS recommends sampling weights for any analysis using EDHS data to ensure representativeness of the survey results at the national and regional level. However, in order for the survey precision in urban areas to be comparable with that in rural areas, urban areas were oversampled. The DHS also advises against use of sample weights for oversampled areas as it drastically overestimates sampling variances and confidence intervals. Since the current study was entirely based on samples from urban Addis Ababa without comparisons with other regions in the country; sample weighting was not needed in the estimation of means, proportions or ratios.”

   c. I am concerned with the categorization of the source of drinking water and sanitation facility. Even though, the categorization is usually subjective and left for the researchers, however, given the fact that the paper is using the DHS, I will advise the authors to align their categorization as much as possible to the definition of improved water and sanitation sources/categorizations given by the WHO/UNICEF joint monitoring programme (http://www.wssinfo.org/definitions-methods/watsan-categories/).

Answer: The indicator classification used was the same as the one suggested by the reviewer i.e., http://www.wssinfo.org/definitions-methods/watsan-categories/. See the following paragraph from the article.
“UNICEF’s multiple indicator cluster survey was used to define source of water and sanitation categories [35]. Source of drinking water was categorized as improved for those who have piped water source, public tap or standpipe, tube well or borehole, protected well or spring and rain water; and unimproved for those with access to water piped outside compound, unprotected well, unprotected spring, well or borehole, bottled water, river/dam/lake/pond/stream/canal/irrigation channel, or tanker truck. As to type of toilet facility—flush toilets, ventilated pit latrine and pit latrine with slabs were categorized as improved and all the rest including pit latrine without slab, open field, composting toilet and others were grouped as unimproved.”

Answer: Corrected. All the variables that showed significant association in the unadjusted model with the outcome variable are included in the model in the revised version.

e. Please include the 95% confidence intervals in the logistic table (table 2)

Answer: Have been included.

5. Results

a. Descriptive analyses: The authors need to clarify the various prevalence rates in the first and second sentence of the second paragraph in the result section by distinguishing between ‘overall obesity’ and ‘urban obesity’. These words and the explanation thereof are somewhat confusing.

Answer: Corrected. It now reads as “The descriptive results show that, for Addis Ababa, the prevalence of overweight rose from 16.1% in 2000 to 20.6% in 2011. The prevalence of obesity increased from 3.0% in 2000 to 4.3% in 2011 (or a 43.3% increase).”

6. Discussion

a. The authors quoted some figures in the second paragraph of the discussion section in pages 12 and 13 regarding rural-urban gap in overweight-obesity in Ethiopia without appropriate referencing. Where are the figures coming from? Are they also from the rapid analysis, who carried out this rapid analyses, from what data, the year, and on which population (female, male, adults, children or total population)?

Answer: Referencing indicated:

“The 2011 EDHS report shows a large rural-urban gap in overweight/obesity among women aged 15-49 years, with rural areas at 2.6% vs. 14.9% in all urban areas (34).”

A rapid analysis was done by the authors using the 2000, 2005 and 2011 national DHS data to see levels of overweight obesity in other urban areas in the country as compared to the study area
(Capital city). This was for rough comparison. However, in sight of the objective of the study and to avoid confusions, the authors agreed to delete this part.

b. The conclusion presented in the last sentence on page 13 paragraph 2 cannot be rightly drawn from the analysis; ‘The continuous......might also indicate that the socio-economic transition in Ethiopia is not benefiting all citizens...’.

Answer: It was an important observation. This section is completely changed in the revised version of the article. The last line of the last paragraph under the discussion and conclusion part reads as:

“Finally, the co-existence of underweight and overweight/obesity in women of both lower and higher socioeconomic groups, despite the fast economic growth in Ethiopia signals the need for further studies focusing on the impact of the socio-economic and demographic transition on the nutrition transition in the country.”

7. Unclear messages in the line of arguments: some sentences require clarity for easy read-through, thorough understanding of thoughts and messages being passed across. Some of these are as follows:

a. P.g 4, the paragraph...’studies conducted in SSA to identify correlates of obesity found higher risk among high wealth quintiles or SES; urbanization.....’ , what does the authors mean by urbanization in this sentence?

Answer: Urbanization replaced by “urban dwellers”.

   a. P.g 4, last sentence in the same paragraph repeats the previous sentence and I am not sure what it means by urbanity

Answer: Urbanity replaced by “urban life style”.

b. Delete ‘in’ and ‘(‘ on page 15 in the sentence, ‘The very fast rise in the .......

Answer: done

c. I am not sure what unintended child birth mentioned in the last paragraph of the discussion section in page 15 has to do with the study or cross-sectional limitation of the paper. I think the authors should give more appropriate limitations.

Answer: The limitation part is modified in an appropriate way. It is moved from the last part of the article to the last section of “Methods and materials) for your reference.

“In interpreting this study's findings, it is advisable to consider some of the limitations of the study. The cross-sectional nature of the data doesn’t allow making causal inferences about the relationship between underweight and overweight/obesity and the socioeconomic and demographic correlates. The data also lacks variables on cardio-metabolic factors, behaviours
and lifestyles. Besides, some variables like partner’s educational status and history of antenatal care couldn’t be included in the analyses due to huge missing values. The study was also totally limited to the capital city and findings might not reflect the situation to the rest of the country.”