Author's response to reviews

Title: Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia

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Author's response to reviews: see over
Point-by-point Response to Reviewers Comments

Dear Editor,

Thank you very much for your valuable comments on our manuscript entitled “Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia” submitted for publication to the BMC Public Health.

We have revised our manuscript according to your comments and have made the required changes or modifications as indicated in the following point-by-point response.

We used the final version of the manuscript to highlight all changes in color to address the comments in a revised manuscript.

Editor’s Comments

STATISTICAL REVIEW SETER SIZIYA

Degree of association was measured by Chi Square test, with significance set at P<0.05. The degree or magnitude of association is measured by OR in this paper and not the Chi Square test.

- We have used the Chi Square test for significance testing of the data in Tables 2 and 4, and p values in these Tables are the output of this analysis. Therefore, we have modified the sentences as follows: “Differences in proportions were compared for significance using Chi Square test. A p-value <0.05 was considered significant”.
- As you rightly said the magnitude of the association between substance use and socio-demographic/behavioral correlates is measured by the OR.

Finally, multiple logistic regression analyses were used to identify factors associated with substance use by controlling for the effect of potential confounding variables. Adjusted ORs and their 95% confidence intervals were reported.
State the confounding factors

- We added the following statement in the methods part of the analysis section of the MS. “Alcohol, khat and tobacco intake were included in the logistic model as dependent variables, while the following factors were included in the model as independent variables: gender, age, religion, source of family income, rural-urban background, medical education status, parental and friends’ substance use”.

Some intervals have too wide confidence intervals? Any comment in the discussion?

- We have discussed about this limitation of the study in the Discussion section of the MS on 4th paragraph of Page 13. Most of the wide confidence intervals were attributed to small sample sizes particularly among female students and also due to the low number of students identified as substance users.

Age in years
15-19
20-24
25- or more
Mean (±SD)

Cannot analyze the same variable both as continuous variable (Mean [SD]) and as a qualitative variable (%).

- We only used “Mean (±SD)” in Table 1 simply to show its measures of central location and dispersion for males and females. Otherwise we did not use this continuous variable in the subsequent analysis.

Consumed alcohol within the last 7 days
Report the p value to 3 decimal places

- Well accepted and we made the changes.

Religion
Report p value to 3 decimal places
• *Well accepted and we made the changes*

Tables 5 and 6

P values are not necessary when 95% confidence intervals have been reported

• *Well accepted and we removed the p values column even including Table 3.*

References

Please provide the full details for reference 24

• *Well accepted and complete citation is made for this reference*

Table 4

Report?* Fisher exact test? In the methods section

• *Well accepted and we described it in the methods section.*

FURTHER REQUIREMENTS

1. The objective of the abstract needs to be merged under the Background section

• Done

2. Please remove the author’s qualifications from the workflow

• Done

3. Ethics – Please document within the methods section of your manuscript the specific name of the organization/university that granted the approval to your study going ahead

• Done

Best regards,
Dear Prof Amy Tsui,

Thank you very much for your valuable comments on our manuscript entitled “Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia” submitted for publication to the BMC Public Health.

We have revised our manuscript according to your comments and have made the required changes or modifications as indicated in the following point-by-point response.

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Review of “Substance use and its predictors among undergraduate medical students in Addis Ababa University, Ethiopia”

This descriptive 2009 study of 622 medical students (426 male and 196 female) in the flagship university of Ethiopia finds use of alcohol in last 12 months to be 22%, khat use in last 12 months to be 7% and current smoking to be 2%. Significant differences by gender are observed. Background factors analyzed for association with use of the 3 substances include gender, age, religion, source of family income, residence, medical education status, parental substance use, and friends’ use of substances. Concordant use of alcohol, khat and tobacco is observed and exposure to friends’ use is often implicated.

The manuscript can benefit from the following changes:
1. Abstract line 3: “devastating” is too strong a word.
   •  Well accepted and we have changed it to more milder word “harmful”

2. The significance of the medical student population is not highlighted in the paper or in the abstract. Why should the reader care about substance use in this student population, which is a fairly elite one? The behavioral consequences as well as the potential impact of substance use on professional performance are not discussed, except in the final section and then only marginally.
   •  Thank you very much and your idea is well taken. We have added a sort of paragraph at the end of the introduction section to highlight the importance of the study among medical students as follows.
“The practice of medicine requires commitment, enthusiasm and altruism, indicating that medical students deserve special attention in relation to alcohol and other drug use. They are the ones who will be responsible for the health of the society in the future. Therefore, it is important to understand the pattern of substance use among this population group”.

3. Although there was IRB review, what steps were taken to ensure confidentiality, since it would be relatively easy to deduce the identity of students who reported consuming or using large amounts of alcohol or khat.

- The names of the students or any of their identity were not recorded on any part of the questionnaires. The students were well informed about the confidentiality issues both during data collection and after that. This part of the ethics has been well presented in the methods section (pages 7 and 8) of the MS. The completed questionnaires were immediately collected by the supervisors and coordinators after data collection, and students did not get any chance or they were not allowed to look for any completed questionnaire.

What is the risk of social desirability bias in the findings?

- This is true and there is a risk of social desirability bias. However, we well informed the students to give us genuine information about their experience and we hope that we gathered valid data. It should be noted that there is always a room for social desirability bias in such studies, which may under estimate the true prevalence of substance use. We have discussed about this limitation of the study in the Discussion section of the MS on 4th paragraph of Page 13.

4. The models for alcohol, khat and tobacco use all have different covariates. Given the concordant use of these substances, it would have been helpful to estimate models with common covariates, where the latter are selected on theoretical grounds. The background factors have more distal associations with substance use behaviors, while the social context factors of parents’ and friends’ use are more proximate (and more interesting). The paper will be stronger with a common specification of factors across the 3 use models.

- Well accepted that we have used the same explanatory variables across the three models. In Table 3, we have dropped a variable “completion of high school in Addis Ababa” as this was found to be similar with the “original background” of the students included in the model.
- On the other hand, we have included “original background” of the students and parental (“fathers and mothers”) khat chewing status in Table 5, and analysis was made accordingly.
- Similarly, we have included the “original background” and the “status of the fathers with regard to smoking” in Table 6. We did not include the “smoking status of the mothers” in this model since only one mother was reported as a smoker.
All changes in the ORs and the CI estimates due to the addition or exclusion of the factors into the models were taken into consideration and corrected in the revised MS.

However, none of the added variables showed statistically significant association with substance use.

5. The significant differences by gender further suggest that it may be an effect modifier and the analysis should be stratified. This could be empirically problematic since there are first fewer female students and second they do not smoke or use khat that often. Thus it’s possible estimation of the female models would not converge. Nevertheless, the pattern of associations for males as compared to females would be important to differentiate and understand separately.

The idea is well taken and we have made analysis to test the evidence for interaction between the covariate gender and the potential risk factors such as parental substance use and friends’ use of substances. We have added the following statement in the methods part of the analysis section of the MS: “The likelihood ratio statistic was used to test the evidence for interaction between the risk factors such friends’ and parental use of substances and the covariate gender”.

For example (Table 3), we have assessed the association between “alcohol use in the last 12 months” (outcome) and “friends’ use of alcohol” as exposure in the first model. In the second stage, we fitted a model including the interaction term between “friends’ use and gender”, as presented below.

```
x:logistic alcoluse frienddr
Logistic regression                               Number of obs   =        622
LR chi2(1)      =      56.03
Prob > chi2     =     0.0000
Log likelihood = -297.37629                       Pseudo R2       =     0.0861
------------------------------------------------------------------------------
alcoluse | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
frienddr |   4.475007   .9249201     7.25   0.000     2.984438    6.710038
------------------------------------------------------------------------------
```

```
est store A
```

```
x:logistic alcoluse i.frienddr*i.sex
Logistic regression                               Number of obs   =        622
LR chi2(3)      =      63.36
Prob > chi2     =     0.0000
Log likelihood = -293.71435                       Pseudo R2       =     0.0974
------------------------------------------------------------------------------
alcoluse | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    _Ifrienddr_1 |   6.755555   2.995044     4.31   0.000     2.833249    16.10784
    _Isex_1     |    2.48218   .9634812     2.54   0.012     1.232688    4.621238
    _IfriXsex_~1 |   .5548651   .2785017    -1.17   0.241     .2074657    1.483981
------------------------------------------------------------------------------
```
The likelihood ratio test suggests a weak evidence of interaction between “friends’ use of alcohol and gender”. That means the estimated effect of “friends’ use of alcohol” in the above two models is not identical.

For the association between alcohol use and parental use and its interaction term for gender:

```
logistic alcoluse fdrinks
```

```
Logistic regression                               Number of obs   =        622  
LR chi2(1)      =      27.49  
Prob > chi2     =     0.0000  
Log likelihood = -311.64506                       Pseudo R2       =     0.0422  
------------------------------------------------------------------------------
  alcoluse | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------  
  fdrinks    |   2.962902   .6069653     5.30   0.000     1.983099    4.426803  
------------------------------------------------------------------------------
```

The likelihood ratio statistic indicates the presence of an interaction between fathers’ use of alcohol and gender.

We have also carried out the same type of analysis between the remaining two outcomes (khat use and tobacco use) and the covariate gender for the existence of interaction with other factors.

With regard to the association between khat use and friends’ use of khat (Table 5) and the interaction of gender, we did not do the analysis since only 3 females reported khat use.
• For the ever use of cigarette as an outcome (Table 6) and friends’ use of tobacco as an exposure and gender as effect modifier, there was no evidence for interaction between gender and friends’ use of tobacco.

. xi:logistic evsmoked friendsm

Logistic regression                               Number of obs   =        622
LR chi2(1)      =      40.27
Prob > chi2     =     0.0000
Log likelihood = -163.42485                       Pseudo R2      =     0.1097

------------------------------------------------------------------------------
evsmoked | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   friendsm  |   6.477612    1.97647     6.12   0.000     3.561997    11.77976
------------------------------------------------------------------------------

. est store A

. xi:logistic evsmoked i.friendsm*i.sex

Logistic regression                               Number of obs   =        622
LR chi2(3)      =      43.55
Prob > chi2     =     0.0000
Log likelihood = -161.78421                       Pseudo R2      =     0.1186

------------------------------------------------------------------------------
evsmoked | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _Ifriendsm_1 |   6.054681   4.228323     2.58   0.010     1.540456    23.7976
   _Isex_1     |   1.944442   1.119472     1.16   0.248     .6291199    6.009753
   _IfriXsex_~1 |   1.000337   .7779358     0.00   1.000      .217866    4.593073
------------------------------------------------------------------------------

. est store B

. lrtest A B

Likelihood-ratio test                                  LR chi2(2)  =      3.28
(Assumption: A nested in B)                            Prob > chi2 =    0.1939

• The likelihood ratio test shows no evidence for the existence of interaction between friends’ of tobacco and gender.

• Considering the ever use of tobacco as an outcome and alcohol use as an exposure and the interaction effect of gender, we obtained the following output with no evidence of interaction between alcohol use and gender.

. xi:logistic evsmoked alcoluse

Logistic regression                               Number of obs   =        622
LR chi2(1)      =      81.49
Prob > chi2     =     0.0000
Log likelihood = -142.81395                       Pseudo R2      =     0.2220

------------------------------------------------------------------------------
evsmoked | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
alcoluse   |   15.90344   5.371062     8.19   0.000     8.203798    30.82954
------------------------------------------------------------------------------

. est store A
. xi: logistic evsmoked i.alcoluse*i.sex

Logistic regression                        Number of obs  =       622
LR chi2(3)     =      84.40
Prob > chi2    =     0.0000
Log likelihood = -141.36011                Pseudo R2     =     0.2299

------------------------------------------------------------------------------
evsmoked | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _Ialcoluse_1 |   8.913043     6.2998     3.09   0.002     2.230442     35.6173
   _Isex_1    |   1.190323   .7244699     0.29   0.775     .3610731    3.924048
   _IalcXsex_~1 |   1.959464   1.586773     0.83   0.406     .4007143    9.581639
------------------------------------------------------------------------------

. est store B
. lrtest A B
Likelihood-ratio test                                  LR chi2(2)  =      2.91
(Assumption: A nested in B)                            Prob > chi2 =    0.2337

+----------------------------------+
| Odds Ratio | Std. Err. | z    | P>|z| | 95% Conf. Interval |                |
|-------------|----------|------|-----|-------------------|----------------|
| _Ialcoluse_1 | 8.913043  | 6.2998 | 3.09 | 0.002 | 2.230442 | 35.6173 |
| _Isex_1 | 1.190323  | 0.7244699 | 0.29 | 0.775 | 0.3610731 | 3.924048 |
| _IalcXsex_~1 | 1.959464  | 1.586773 | 0.83 | 0.406 | 0.4007143 | 9.581639 |
+----------------------------------+

- Finally, we have summarized the analysis of the interaction terms and included in the results section of the revised MS.

6. The large confidence intervals bely the disproportionate distribution of cases in relation to the outcome. When the measured outcomes are so low, e.g., 1, 2%, there is not much utility in estimating associated factors. There is no variation to be explained. I advise estimating gender-specific models, even if their model specifications (covariates) end up being different.
   - We have indicated in the limitations of the study about the small number of frequencies and their implications on confidence intervals.
   - We have also addressed very well about the gender specific models in the previous section (no. 5)

7. In the discussion, the authors note that the levels of use among the AAU medical students are much lower than those found in other studies. They need to justify why study attention is warranted.
   - Ethiopia is a country with large population size, of which adolescents’ constitute the largest share of the total population. Most of these adolescents are also found in high schools and colleges, of which medical students are part of them. There are currently over 15 universities with medical training programs in the country, and this number will be over 20 in the next few years.
   - The trend shows that the use of substances in schools and colleges is very high, with a possible extension to medical students in the universities. Anecdotal evidences also indicate that the prevalence of HIV among university students in the country is very alarming. Currently, there is a university-wide study underway in different universities in the country about HIV problem and its prevention and control methods. This warrants further study and evidence-based planning to tackle this growing problem in the country. That is why we have suggested a further study assess the problem in the country.
8. The authors should also be careful in the discussion when comparing their findings on substance use with those from studies with different study populations, e.g., adolescents, students in general etc.

- The comment is well taken and it would have been better if we got similar studies on the medical students in Ethiopia. Unfortunately, such studies are lacking and most of the studies focused on adolescents’ in-school and out of school youths. That is the reason why we made comparisons in the discussions with adolescents and youths since they are almost identical in their age and risk taking behaviors.

9. Please check the percent distributions, shown in Table 1, for completeness. Each should add to 100% but, for example, parent’s education x female does not (off by 4.1%).

- Well accepted the comment and have corrected the errors in Table 1. In fact initially we have merged the educational status of mothers and fathers. But now we have split and presented them separately. We have also checked for those numbers and percentages in the text.

Best regards,

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being Published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests.
Point-by-point Response to Reviewers Comments

Dear Dr. Victor M,

Thank you very much for your valuable comments on our manuscript entitled “Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia” submitted for publication to the BMC Public Health.

We have revised our manuscript according to your comments and have made the required changes or modifications as indicated in the following point-by-point response.

We used the final version of the manuscript to highlight all changes in color to address the comments in a revised manuscript.

Major Compulsory Revisions.
1. The authors should revisit the title, is it substance use or abuse? Substance use may be harmless.
   • We have thoroughly discussed about the similarity and differences between use and abuse of substances during the proposal writing and also afterwards. The aim of our study was to determine the use of substances; it was not intended to determine the abuse due to substances. Abuse is something related to the harmful use of drugs or alcohol. Substance use may be harmless, but it is the pathway towards the development of substance abuse and dependence problems. The study of substance abuse may also require stronger methodological approach than the one point time cross-sectional design we used in this study. That is why we have decided to make our title “Substance Use” rather than “Substance Abuse. We have also corrected those issues in the MS which are related to substance abuse to make it relevant to the substance use.

2. In the Abstract, the objective should be "to determine" rather than to "to assess" the prevalence of substance abuse and "identify" factors.....
   • Well accepted and we made the changes.

3. In the abstract, where is the analysis to support association between "use" and parental use of substance?
• Well accepted and we have modified the last sentence to “…between substance use and socio-demographic and behavioral correlates”. Parental use of substance falls in the socio-demographic and behavioral correlates.

4. In the Introduction, let the authors decide is it abuse or use?
• We have decided on “Substance Use” as stated above, and made the necessary corrections in the introduction.

5. In the second paragraph of Introduction, first sentence, let the sentence end at drugs and start the second sentence with "This problem highly impairs ......"
• Well accepted and we made the changes

6. On page 5, second paragraph, what are these "chronic problems"?
• We finished the sentence by adding “psychiatric disorders such as lethargy, hopelessness and insomnia”.

7. On page 5, again decide is it use or abuse. If it is just use how did you grade it? and the same applies for "abuse", what is the grade.
• We did not go into the details of the grades of the substances used by the students. The study was simply based on whether they used the substances in terms of the lifetime, past one year and current use.

8. On page 5, third paragraph, the second sentence should be "The magnitude of self reported substance abuse and identify risk factors." Again why have you used "substance abuse" and not "substance use"?
• Well accepted and we have corrected to substance use.

9. Page 6, second paragraph, this was a qualitative research study and what you collected is "qualitative data" and not "quantitative data" since the collected data is subjective.
• When we say quantitative, we mean that the data can be quantitatively expressed in numbers or frequencies unlike that of the qualitative study (e. g., FGDs and in-depth interviews). It is this quantitative nature of the data that enables us to apply statistical analysis for measuring the association between substance use and socio-demographic and behavioral correlates.

10. Page 8, 9, 10, 11, under Results, this needs to be re-written. What you have written here is already presented in the Tables 1-6. This is a repetition and not interesting. Pick out only significant observations and summarize observations and make reference to the appropriate tables. Do NOT repeat what is already in the tables.
• We tried to focus on the main findings of the nation of the findings presented in the Tables. However, narrative description of the findings in the Tables is also
well accepted and we have seen this in the BMC Public Health since they do not have page limitations.

11. Page 9. first paragraph, "illiterate" and NOT "not literate"
   - Well accepted and we have corrected it.

12. End you paper with "Recommendations"
   - Although we are not sure, according to the format of the Journal, there is no separate section for “Recommendations”. The recommendation is simply merged under the Conclusion section.

Best regards,

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

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

Declaration of competing interests: I declare that I have no competing interests