Reviewer’s report

Title: Hypocholesterolemia is an independent risk factor for depression disorder and suicide attempt in Northern Mexican population

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Reviewer: Jan Cwik

Reviewer’s report:

The present study aimed to investigate the link between serum cholesterol and its associations with depression disorder and suicide attempt. Therefor the authors investigated a sample of 467 adult subjects in a Mexican mestizo population. As results of the study, the authors report a significant decrease in total cholesterol, LDL-cholesterol, VLDL-cholesterol, and triglyceride serum levels in participants with MDD and suicide attempts compared to participants without MDD or suicide attempts.

Generally, I think that the study focuses on a scientific relevant topic and is of interest for readers of BMC Psychiatry. However, I think there are several aspects that should be revised:

Major points:

1. The manuscript is in not line with the manuscript guidelines of BMC Psychiatry. For example the authors list multiple references in the manuscript as follows: [2,14,15,16]. Instead, these references should be listed that way: [2,14-16]. Additionally, in the reference section some references are listed inconsequently and not in line with the journals recommendations. I would recommend using citation software and the BMC Psychiatry citation style to solve this problem.

2. On page 3 (line 54-58) the authors state: "Although roughly 60% of all suicides occur in the context of depressive disorders [6,7] it is still challenging for clinicians to predict suicide risk in patients with depression. For this reason, increased attention has been paid to potential biomarkers for suicide in patients with major depression disorder (MDD) and suicidal behavior [1,8]". It is unclear how clinicians (especially non medical clinicians) could utilize biomarkers to predict suicide risk in their daily practice. Additionally, do the authors have any information of the content of explained variance of suicidal behavior by such biomarkers? This should be considered in the manuscript.

3. As a second hypothesis the authors assume: "2) Hypocholesterolemia is a risk factor associated with depression and suicide attempt." As the authors correctly state in the limitations, the study design is not suitable to make any predictive assumptions. This hypothesis should be deleted or rephrased.

4. According to the methods section, MDD was diagnosed according to DSM-5 diagnostic criteria. It is completely unclear in what way the criteria were checked? Did the authors
use structured diagnostic interviews? Or self-rating questionnaires? Or open clinical interviews? This should be stated and possibly considered as a limitation, if only self-rating scales or open clinical interviews were used.

5. The authors report that they used a multiple linear regression analysis to determine the association between hypocholesterolemia, and the presence of depression and suicide attempt. I was wondering whether the data was checked for multicollinearity?

6. In their conclusions, the authors state that their findings "... could have important implications for public health policies...". At first, facing the fact that this study has a cross-sectional design, this assumption is a bit prematurely out of my point of view. Additionally, the clinical implications of the study's results are only marginally discussed in the manuscript.

7. The manuscript needs some language corrections before being published. For instance check the following sentences on page 5 (line 115-119): "... Post-hoc analysis demonstrated that patients with MDD were associated with suicide attempt (p 0.000) and subjects with only MDD (p 0.000) had significantly lower total cholesterol levels than the control group. Also, patients with MDD who were associated with suicide attempt had significantly lower total cholesterol levels than subjects with only MDD (p 0.016)." Or the sentence on page 6 (line 124): "However, only in females, did we observe significant differences between MDD-only group compared with the control group". Additionally the Oxford comma should be used consequently.

Minor points:

1. Please do not write DSM-V. Since the fifth edition the APA uses Arabic numerals: DSM-5. Additionally, the reference of DSM-5 should be listed.

2. The first sentence of the background sections sounds as if suicide is a CONSEQUENCE of psychiatric treatments. Please rephrase this sentence.

3. Please do not use p = .000. This is impossible from a theoretical point of view. Instead you should write p < .001.

4. Title: Considering the fact that this study is based on a Mexican population exclusively, this fact should be reflected by the title of the study.

5. Abbreviations like OR or CI should always introduced once.

6. Statistical parameters in Latin letters (SD, p, n, OR, CI) should always be written in italic letters. Please also check the tables.

7. Two references are not cited correctly: page 11, line 191-197: "da Graça et al. in 2015 ... [57]" and „2016 by Pearson et al., ... [58]".
8. There are some typos in the manuscript, e.g., on page 11 (line 186-187): „However, others studies...“ → „However, other studies...“.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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