

Response to reviewers.

Authors:

Dear Professor Felipe Fregni and Editors,

I wish to resubmit the manuscript title "Exploring the relationship between physical activity and depression in women using the National Health and Nutrition Examination Survey (NHANES) 2017-2018 dataset" The manuscript ID is: 395

We would like to thank you for your thoughtful suggestions and advice, which have been beneficial for our work. We are looking forward to advance into the process of publication.

## **Reviewer 1:**

### **1. Introduction**

"The background for the topic of interest was well laid out with descriptions of the global burden of depression and depression in women as well as information on what has previously been explored regarding the relationship between depression and physical activity. Most highlighted studies show the benefit of increasing physical activity with a reduction in symptoms of depression. Few studies show an inverse relationship.

Innovation – The Innovation of the study and identified gaps in the literature need some work to highlight how this study aims to contribute to what is already known about depression and physical activity."

"Why must we undertake this project?"

**ANSWER:** Unlike previous studies, the aim of our study is to determine the association between physical activity and the development of depressive symptoms specifically in women, as well as factors that may contribute to it, such as comorbidities, sociodemographic factors, and dietary characteristics.

"What will be the impact of our anticipated results?"

**ANSWER:** If physical activity improves outcomes, promoting exercise should be part of tailored mental health strategies for the female population, especially among subgroups that might be at greater risk of developing depressive symptoms.

"How will the project add value to existing literature if we have negative findings?"

**ANSWER:** After modifications in our model (specified in the methodology section), our findings are actually positive. There was a strong association both between moderate and vigorous physical activity, which align with current evidence regarding beneficial effects of physical activity on depressive symptoms in the female population.

### **2. Methodology**

“This is a well-organized section. The rationale for the choice of statistical tests is clear, and these tests have also been appropriately used.”

**ANSWER:**

Important covariates like sedentarism, arthritis, and thyroid disease which can all affect physical activity were also accounted for in the logistic regression model.

### **3. Discussion**

“Revise to improve clarity. Given the strong association between moderate and vigorous activity in our model, the lack of a statistically significant effect of vigorous exercise on depression may be attributable to its strong correlation with moderate activity.”

**ANSWER:** Thank you for your suggestion. Limitations are valid as causality cannot be inferred from this analysis. An appropriately designed longitudinal study can address causality in this context in the future. The model was modified and we found a statistically significant effect of Vigorous PA and Moderate PA and corrected this line.

**Reviewer 2:**

#### **1. Results:**

Comment 1: “In Table 1, please add a row for non-responses regarding Smoking Status to match the total sample size.”

**ANSWER:** Thank you for this observation, Smoking was codified as “smoked at least 100 cigarettes” the answers were “yes” which was subsequently divided in “current smoker” and “past smoker” the rest of the non-responses were under the “no” category.

Comment 2: “In Figure 1 (Determination of Sample Size), males are not part of your sample, so it would be more appropriate not to list them as excluded. Please review this.”

**ANSWER:** Thank you for your observation. The flowchart shows the screening process, from the initial complete database to the selection of the analyzed sample, so that the number of observations included can be verified by replication. The screening process is clarified in *Methods, Study population and design*.

Comment 3: “I would also suggest discussing marital status, income, and BMI briefly in the discussion section to avoid overlooking these variables.”

**ANSWER:**

Thank you for suggesting the inclusion of marital status, income, and BMI in the discussion section. We have now expanded the discussion to address these variables. Specifically,

we noted that marital disruption was associated with higher odds of depression, suggesting the potential influence of social and emotional factors on mental health. Regarding income, while trends toward higher odds of depression at lower income levels were observed, they did not reach statistical significance in our analysis, warranting further exploration in future studies. For BMI, we acknowledge its complex role in depression, as higher BMI categories showed variable, non-significant associations with depressive symptoms. These additions provide a more comprehensive interpretation of our findings.