Identifying Non-Linear Predictors of Suicidal Ideation in Hospitalized Youth using SHAP-explained Extreme Gradient Boosting

Petrus. Amutenya[1]*, Sofía. Alvarado[2], Manuel. Vaultier[3]

[1] Department of Psychology, University of Namibia, Windhoek, Namibia
[2] Department of Clinical Psychology, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala
[3] Department of Educational Foundations, University of Nigeria, Nsukka, Nigeria

* **Corresponding author email address**: pamutenya@unam.na

Editor	Reviewers
Ahmad Amani Associate Professor, Counseling Department, University of Kurdistan, Sanandaj, Iran a.amani@uok.ac.ir	**Reviewer 1:** Iheanyi Iwueze Department of Psychology, North-West University, Potchefstroom, South Africa. Email: iheanyiiwueze@gmail.com **Reviewer 2:** Sue J Critchley National Institute of Psychiatry Ramón de la Fuente Muñiz, Sub-directorate of Clinical Research, Mexico City, Mexico. Email: sue-j-critchley@gmail.com

1. Round 1

1.1. Reviewer 1

Reviewer:

The introduction demonstrates an impressive breadth of up-to-date literature on adolescent suicidal ideation; however, it is overly expansive and somewhat diffuse, and would benefit from being streamlined to focus more tightly on predictor domains that are actually included in the empirical model, thereby sharpening the conceptual pathway from prior research to the current study's aims.

While the rationale for using XGBoost combined with SHAP is well articulated and clearly grounded in the non-linear, interactive nature of suicide risk, the manuscript does not yet specify sufficiently clear research questions or hypotheses (even if exploratory), and I recommend formulating explicit primary aims (e.g., prediction performance and identification of key risk domains) to guide the reader and anchor the analyses.

The authors correctly identify SHAP as a powerful tool for explaining individual feature contributions, but the current framing risks overstating interpretability; I recommend adding a concise discussion of SHAP's limitations (e.g., instability under feature collinearity, dependence on background data) and clarifying how these issues were mitigated or interpreted in the present analysis.

Authors uploaded the revised manuscript.

1.2.   Reviewer 2

Reviewer:

The authors provide a rich description of psychiatric, developmental, environmental, and lifestyle risk factors, but it remains unclear which of these constructs are operationalized as predictors in the dataset; for methodological transparency, a concise mapping table that links theoretical constructs to specific measured variables and instruments would greatly enhance the clarity of the design.

The narrative style of the introduction is dense, with long sentences and stacked citations that may impair readability, especially for non-specialist readers; I suggest restructuring into clearly labeled subsections (e.g., "Clinical Predictors," "Developmental Adversity," "Lifestyle and Sleep," "Rationale for Machine Learning") and shortening sentences to improve flow and comprehension.

The decision to use XGBoost for prediction is appropriate for capturing complex non-linearities, yet the manuscript should provide more detail on model development and validation procedures (e.g., train–test split, cross-validation scheme, hyperparameter tuning, handling of class imbalance) to allow readers to evaluate the robustness and potential overfitting of the model.

Authors uploaded the revised manuscript.

2.   Revised

Editor's decision after revisions: Accepted.
Editor in Chief's decision: Accepted.