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Hybrid Machine Learning Framework for Predicting Family Adaptation to Chronic Illness

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1. Round 1

1.1. Reviewer 1

Reviewer:

In the statement "family adaptation is not merely a psychosocial construct but a critical determinant of long-term health trajectories," please specify what types of health trajectories (e.g., treatment adherence, morbidity, hospitalization) are most relevant to the model being developed.

The critique of traditional statistical methods would be strengthened by explicitly stating why linear models are inadequate for the structure of the current dataset, such as their inability to model nonlinear interactions among psychosocial variables.

When stating that "Hybrid frameworks combine the strengths of multiple learning algorithms," the manuscript should briefly justify why the selected algorithms (gradient boosting, random forest, SVM) are theoretically suitable for modeling psychosocial and relational data.

The term "predictive modeling design" is used without formal definition. Please clarify whether the design is intended to be purely prognostic or whether it incorporates any explanatory modeling components.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

Please clarify whether the Family Adaptation Scale underwent cultural adaptation or validation for the Chilean context and describe this process briefly.

The description of multiple imputation should include the imputation method, number of imputations, and missing data mechanism to allow proper evaluation of data integrity.

Feature selection involved recursive feature elimination, mutual information, and expert filtering; however, the manuscript should explain how disagreements between these methods were resolved.

The claim of "excellent discriminative power" should be supported by reporting confidence intervals for AUC to provide inferential context.

Relative importance values are presented without specifying the computation method (e.g., SHAP-based importance), which should be explicitly stated.

The conclusion that "family functioning emerged as the most influential predictor" would be strengthened by specifying which dimensions of family functioning were most impactful.

Response: Revised and uploaded the manuscript.

2. Revised

Editor's decision after revisions: Accepted.

Editor in Chief's decision: Accepted.

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