




Random Forest Prediction of Maternal Burnout Based on Parenting Stress, Perfectionism, Emotional Dysregulation, and Family Functioning

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1. Round 1

1.1. Reviewer 1

Reviewer:

In the Methods section, paragraph 1 under “Study design and Participant,” the authors describe recruitment from “online advertisements, community parenting groups, family health centers, schools, and social media platforms.” This recruitment strategy is broad but insufficiently specified. The manuscript should state whether sampling was convenience, purposive, stratified, or quota-based; which Malaysian regions were included; whether rural mothers were represented; and how duplicate online responses were prevented.

In Table 2, the reported adjusted R^2 of .728 appears to be presented for a Random Forest model. Adjusted R^2 is traditionally defined for parametric linear models with a specified number of predictors and may not be directly meaningful for nonparametric ensemble models unless carefully adapted. The authors should either justify the formula used for adjusted R^2 in this context or remove it to avoid methodological ambiguity.

In Table 3, feature importance is reported as “Parenting Stress 38.7%, Emotional Dysregulation 29.1%, Family Functioning 19.6%, and Perfectionism 12.6%,” but the manuscript does not specify whether these are impurity-based importances, permutation importances, or SHAP-based mean absolute values. Since impurity-based Random Forest importance can be

biased, the authors should identify the exact method and preferably report permutation importance or SHAP-derived importance with uncertainty estimates.

In Table 4, the incremental model comparison enters predictors in the order “Parenting Stress,” then “Perfectionism,” then “Emotional Dysregulation,” then “Family Functioning,” but this ordering appears arbitrary and may determine the apparent incremental contribution of variables. The authors should justify the order theoretically or conduct all-subsets comparison, permutation-based variable contribution analysis, or nested cross-validated comparisons to avoid order-dependent interpretation.

In Figure 1 and the accompanying paragraph, the authors state that SHAP analysis revealed “nonlinear interactions among variables, particularly between parenting stress and emotional dysregulation.” However, a standard SHAP summary plot alone does not demonstrate interactions unless SHAP interaction values, dependence plots, or interaction diagnostics are shown. The authors should add SHAP dependence plots for parenting stress and emotional dysregulation or remove the interaction claim.

Authors revised the manuscript and uploaded the document.

1.2. Reviewer 2

Reviewer:

In the Methods section, the eligibility criterion “having sufficient proficiency in English or Malay to complete the questionnaires” raises an important measurement issue. The authors should specify whether validated Malay versions of the PBA, PSS, MPS, DERS, and FAD were used, whether translation/back-translation was conducted, and whether measurement equivalence across English and Malay respondents was assessed.

In the Measures section, the paragraph on the Parental Burnout Assessment states that previous studies demonstrated “strong psychometric properties,” but the manuscript does not report reliability coefficients for the current sample. The authors should report Cronbach’s alpha or McDonald’s omega for the total scale and subscales, as well as evidence of internal consistency for each instrument used in the study.

In the Measures section, the Family Assessment Device paragraph states that “Lower scores generally reflect healthier family functioning, whereas higher scores indicate greater dysfunction.” However, Table 1 labels the variable as “Family Functioning” and reports a negative correlation with maternal burnout. The authors should clarify whether higher values represent healthier functioning or greater dysfunction, because the current terminology may invert the interpretation of the correlation and feature-importance findings.

In the Data Analysis section, the sentence “Missing values were examined and handled through appropriate imputation procedures when necessary” is too vague for a predictive-modeling study. The authors should report the percentage and pattern of missingness, the imputation method used, whether imputation was performed within the training set only to avoid information leakage, and whether sensitivity analyses were conducted.

In the Data Analysis section, the manuscript states that hyperparameter optimization was conducted using “grid search procedures combined with five-fold cross-validation,” but no hyperparameter grid is provided. The authors should report the tested and selected values for number of trees, maximum depth, minimum samples per split, minimum samples per leaf, feature sampling strategy, random seed, and any stopping or pruning criteria.

In the Findings section, the demographic paragraph reports that mothers with three or more children had higher parenting stress and burnout, and employed mothers had slightly elevated burnout scores. These statements imply inferential group comparisons, but no test statistics, p-values, confidence intervals, or effect sizes are reported. The authors should either provide full inferential results or revise the wording so that these observations are clearly descriptive.

In Table 1 and its interpretation paragraph, the correlation between parenting stress and maternal burnout is very high, “ $r = .76$.” This raises concerns about conceptual redundancy and possible multicollinearity, even if the authors state that none of the intercorrelations indicated problematic multicollinearity. The authors should report variance inflation factors, tolerance values, or condition indices and discuss whether parenting stress and burnout are empirically separable in this dataset.



Authors revised the manuscript and uploaded the document.

2. Revised

Editor's decision: Accepted.

Editor in Chief's decision: Accepted.