Supplementary materials

Supplementary Table 1. Observed and predicted Mongomery-Asberg Depression Scale (MADRS) scores in 12 weeks of treatment. Imputation was done for MADRS scores at baseline (week 0) and weeks 1, 2, 4, 6, 8, 10, and 12.

WEEKS	N	AVERAGE ± SD	T-TEST
BASELINE	O: 453 I: 454	O: 27±6 I: 27±6	t(905) = -0.014, p = 0.989
1	O: 442 I: 454	O: 23±8 I: 23±8	t(894) = -0.053, p = 0.958
2	O: 440 I: 454	O: 20±8 I: 20±8	t(892) = 0.141, p = 0.888
4	O: 420 I: 454	O: 18±9 I: 18±9	t(872) = -0.063, p = 0.950
6	O: 411 I: 454	O: 17±9 I: 17±9	t(863) = -0.166, p = 0.868
8	O: 399 I: 454	O: 15±9 I: 15±9	t(851) = -0.340, p = 0.734
10	O: 392 I: 454	O: 14±10 I: 14±9	t(844) = -0.196, p = 0.845
12	O: 94 I: 454	O: 15±8 I: 14±7	t(546) = 1.052, p = 0.293

I = Imputed data, O = original data, SD = standard deviation

Supplementary Material 1. TRIPOD checklist[1]

Section/Topic	m	Checklist Item	Page
Title and abstract			
Title	1	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.	1
Abstract	2	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.	3
Introduction			
Background and objectives	3a	Explain the medical context (including whether diagnostic or prognostic) and rationale for developing or validating the multivariable prediction model, including references to existing models.	5-6
	3b	Specify the objectives, including whether the study describes the development or validation of the model or both.	5-6

Methods			
Source of data	4a	Describe the study design or source of data (e.g., randomized trial, cohort, or registry data), separately for the development and validation data sets, if applicable.	6
	4b	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	6
Participants	5a	Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.	Referenced study with these details
	5b	Describe eligibility criteria for participants.	Referenced study with these details
	5c	Give details of treatments received, if relevant.	6
Outcome	6a	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	7-9
	6b	Report any actions to blind assessment of the outcome to be predicted.	N/A
Predictors	7a	Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.	6-7, 9
	7b	Report any actions to blind assessment of predictors for the outcome and other predictors.	Not done
Sample size	8	Explain how the study size was arrived at.	9
Missing data	9	Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method.	7
Statistical analysis methods	10a	Describe how predictors were handled in the analyses.	9
	10b	Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation.	9
	10d	Specify all measures used to assess model performance and, if relevant, to compare multiple models.	10
Risk groups	11	Provide details on how risk groups were created, if done.	N/A
Results			
Participants	13a	Describe the flow of participants through the study, including the number of participants with and without the outcome and, if applicable, a summary of the follow-up time. A diagram may be helpful.	10-11
	13b	Describe the characteristics of the participants (basic demographics, clinical features, available predictors), including the number of participants with missing data for predictors and outcome.	10-11, Table 1
Model development	14a	Specify the number of participants and outcome events in each analysis.	14-15, Figure 1
	14b	If done, report the unadjusted association between each candidate predictor and outcome.	Not done.

Model specification	15a	Present the full prediction model to allow predictions for individuals (i.e., all regression coefficients, and model intercept or baseline survival at a given time point).	Figure 1.
	15b	Explain how to the use the prediction model.	14-15
Model performance	16	Report performance measures (with CIs) for the prediction model.	14-15
Discussion			
Limitations	18	Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data).	17
Interpretation	19b	Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence.	15
Implications	20	Discuss the potential clinical use of the model and implications for future research.	17
Other information			
Supplementary information	21	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.	Done throughout the manuscript as appropriate.
Funding	22	Give the source of funding and the role of the funders for the present study.	19

[1] Collins GS, Reitsma JB, Altman DG, et al. Transparent reporting of a multivariable prediction model for individual prognosis or diagnosis (TRIPOD): the TRIPOD statement. BMJ 2015;350:g7594. doi: 10.1136/bmj.g7594.

Supplementary Material 2. Sample size calculation using Riley and colleagues' method[2]

Riley and colleagues recommend a new sample size approach where the minimum sample size must fit the following criteria: i) global shrinkage factor greater than or equal to 0.5, representing a small optimism in predictor effect estimates; ii) there is a difference of less than or equal to 0.05 between adjusted and apparent Nigelkerke's R^2; and iii) sample size allows for precise estimation of overall risk (corresponds to prevalence in our model)[2]. Criteria 1 and 2 aim to reduce the risk of the model being overfitted to the training dataset, and criterion 3 aims to ensure precise estimation of risk/ prevalence. Please refer to Riley and colleagues[2] article for the formulas. Our model has a total of 14 parameters. We obtained n (number of participants; 219) and E (number of events; 105) from Joel and colleagues' analysis, which used a completer sample from the IRL-GRey study to perform logistic regression to predict remission[3]. Global shrinkage factor was set to 0.90 and Nigelkerke R^2 was set to 0.5 as recommended by Riley and

colleagues because it was not reported by Joel and colleagues and one of the predictors included a direct measurement (i.e., baseline MADRS). Minimum sample size according to criteria 1, 2, and 3 were 260, 290, and 384, respectively.

References

1. Collins GS, Reitsma JB, Altman DG, et al. Transparent reporting of a multivariable prediction model for individual prognosis or diagnosis (TRIPOD): the TRIPOD statement. *BMJ* 2015;350:g7594. doi: 10.1136/bmj.g7594
2. Riley RD, Snell KI, Ensor J, et al. Minimum sample size for developing a multivariable prediction model: PART II - binary and time-to-event outcomes. *Stat Med* 2019;38(7):1276-96. doi: 10.1002/sim.7992
3. Joel I, Begley AE, Mulsant BH, et al. Dynamic prediction of treatment response in late-life depression. *Am J Geriatr Psychiatry* 2014;22(2):167-76. doi: 10.1016/j.jagp.2012.07.002