Predicting Suicide Attempt Risk: Logistic Regression Requires Large Sample Sizes

To the Editor: Dr Gilbert and colleagues make an important point about the difficulties in predicting suicide,[1] but their conclusions do not follow as strongly from their data as they suppose. They report negative findings based on logistic regressions using clinical, demographic, and cognitive predictor variables. However, their data set is relatively small, with 28 events (suicide attempts) in 67 subjects; their regressions use 12 clinical and demographic predictors and, separately, 7 cognitive and demographic predictors. Simulation experiments[2] have shown that logistic regression requires roughly 10 events per predictor, which would limit its use to 2—or, if stretched, 3—predictors for their dataset. The effect for the study in question is not entirely clear, but performing regressions below the advisory event per predictor threshold can bias the coefficients and distort the standard errors and could have been responsible, at least in part, for failure to reach statistical significance. The take-home message is that logistic regression requires relatively large sample sizes for proper statistical inference.[3]

In passing, I note that the odds ratios listed in their Table 3 are, incorrectly, copies of the β coefficients; the proper odds ratios can be computed by raising e, the base of the natural logarithm, to the power β.

References

1. Gilbert AM, Garno JL, Braga RJ, et al. Clinical and cognitive correlates of suicide attempts in bipolar disorder: is suicide predictable? *J Clin Psychiatry*. 2011;72(8):1027–1033.
2. Peduzzi P, Concato J, Kemper E, et al. A simulation study of the number of events per variable in logistic regression analysis. *J Clin Epidemiol*. 1996;49(12):1373–1379.
3. Bagley SC, White H, Golomb BA. Logistic regression in the medical literature: standards for use and reporting, with particular attention to one medical domain. *J Clin Epidemiol*. 2001;54(10):979–985.

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