Interaction Between Prestroke Cognitive Performance and Incident Stroke in Predicting Risk of Dementia

To the Editor:

Reitz and colleagues examined whether 2 important dementia risk factors—cognitive performance and incident stroke—have an interactive effect on subsequent dementia risk or have only independent effects. They reported finding no interaction between incident stroke and prestroke cognitive function or decline in predicting the risk of subsequent dementia. Unfortunately, the only statistical measures given to describe the apparent lack of interaction were probability values for the interaction terms between incident stroke and baseline MMSE score ($P_{H11005} = 0.7$) and between incident stroke and rate of decline in MMSE score over time ($P_{H11005} = 0.5$). These probability values are not sufficient evidence on which to judge the presence or absence of an interaction.

A few key statistical elements that were not included in their report would have been more helpful in assessing the presence or absence of an interaction. First, although the Kaplan–Meier survival curves in the figure were given separately for prestroke MMSE $\geq 26$ and $<26$ in participants with incident stroke, the participants without incident stroke were represented by a single survival curve, not stratified by MMSE score. Dichotomizing the nonstroke participants by MMSE score would have allowed the comparison of 4 survival curves, corresponding to the 4 strata important for detecting the interaction of interest: high MMSE and no stroke, high MMSE and stroke, low MMSE and no stroke, low MMSE and stroke.

Second, although the authors presented the hazard ratio for stroke adjusted for prestroke MMSE, and the hazard ratio for prestroke MMSE adjusted for stroke, they did not present stratum-specific hazard ratios for stroke in low- and high-MMSE strata, or the stratum-specific hazard ratios for low versus high MMSE in stroke and nonstroke strata. Again, the presentation of stratum-specific results would have aided greatly in the assessment of a possible interaction between incident stroke and prestroke cognitive performance.

Finally, the coefficients and 95% CIs for the interaction terms included in the models, corresponding to the reported probability values mentioned above, were not provided. Even without being able to examine stratum-specific results, the coefficients and 95% CIs for the interaction terms could have shed more light on whether the failure to observe a statistically significant interaction was more likely due to insufficient sample size or to the effect of stroke truly being equal across MMSE strata and vice versa. Although the analysis was based on nearly 7000 study participants, only 55 participants were diagnosed with dementia, suggesting that the statistical power to detect interactions between dementia risk factors (or confidently exclude the presence of interactions) may have been quite low.

This work by Reitz and colleagues was based on a rigorously designed, well-conducted epidemiological study, and indeed is an important contribution to the effort to understand the determinants of dementia risk. However, their report would have been more useful if it had included all the available statistical evidence for assessing interactions between variables, rather than including only probability values with the implication that probability values $>0.05$ indicate an absence of interaction.

Disclosures

None.

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