M-06

Incorporation of Neuropsychiatric Inventory (NPI) Symptom Scores in an Alzheimer’s Disease Simulation Model

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Objectives: The behavioral and psychological symptoms (e.g., depression, anxiety, and irritability) of patients with dementia (BPSD) are a source of significant distress and poor quality of life to patients and their caregivers. BPSD are often measured with the Neuropsychiatric Inventory (NPI) which assess 12 symptoms based on caregiver information. The NPI outcome is usually expressed as the sum of the individual symptom scores. Evaluation of each symptom is useful when assessing the value of a therapeutic intervention on health economic outcomes, caregiver burden, or psychiatric medication use. Our objective was to update an established model of the NPI total score that was part of an Alzheimer’s health economic model with one based on individual symptom scores.

Methods: NPI subscale correlation matrices were developed using baseline placebo NPI data on 954 patients extracted from several Alzheimer’s clinical trials and a published confirmatory factor analysis (CFA) based on longitudinal data. A bounded distribution was assigned to each subscale based on the sample mean and standard deviation of a given NPI symptom score. Cholesky decomposition and multivariate sampling were used to simulate a dataset of subject level correlated NPI symptom scores. The NPI symptom scores, along with other disease markers (e.g., ADAS, MMSE) were then used to predict Alzheimer’s disease progression.

Results: The correlation matrix derived from the clinical trial data agreed well with the matrix derived from the published CFA, and the simulation reproduced those correlations well (Figure 1). The strongest correlations were observed between the following subscales: agitation-irritability (0.50), anxiety-depression (0.40), delusion-hallucination (0.38), and irritability-depression (0.34). No negative correlations between subscales were identified.

Conclusions: Our method allows for characterization of individual neuropsychiatric symptom scores. Alzheimer’s disease (AD) simulation models can incorporate this approach to explore the impact of treatments that may impact components of the NPI.

References: