Remote assessment of cognition in participants with and without amyloid PET positivity
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Purpose Remote monitoring of cognition, using self-administered cognitive assessments, is of increasing interest in the field of aging and Alzheimer's research. Advantages include ecological validity and more frequent assessments which may reveal subtle cognitive changes in the early stages of dementia that cannot be detected by standard neuropsychological testing [1]. The Survey for Memory, Attention, and Reaction Time (SMART) is a brief, web-based, self-administered cognitive assessment that measures visual memory (Visual Memory Task), attention processing speed (Trails A and Trails B), and executive functioning (Stroop Color-Word Interference Task) [2]. In a simulated clinical trial of participants with and without amyloid PET positivity, we examined whether monthly administration of the SMART survey could detect clinically meaningful cognitive changes in individuals with pre-symptomatic Alzheimer's disease. **Method** DETECT-AD (Digital Evaluations and Technologies Enabling Clinical Translation for Alzheimer's Disease; NCT05385913) is a simulated anti-amyloid trial using digital biomarkers as outcome measures. Older adults (n=103, ≥65 years) with clinically pre-symptomatic and prodromal Alzheimer's disease were enrolled and divided into amyloid-beta (Aβ) "positive" and "negative" groups based on Aβ Florbetapir-PET status (SUVR > 1.11 versus SUVR ≤ 1.11). Participants completed the SMART survey monthly via the Qualtrics Survey Platform (Qualtrics, PROVO). Adherence to the SMART survey, relationships to SUVR, CDR score, MOCA score, PACC-5 score, and mild cognitive impairment (MCI) diagnosis, and trajectories of change over the first 12 months of the DETECT-AD study were analyzed. **Results and Discussion** Participants (n=103) completed 96.9% of administered SMART surveys in the first 12 months of DETECT-AD (mean 11.3, SD 1.7). SMART surveys were completed using laptop computers (38.4%), desktop computers (24.4%), tablets (19.8%), and smartphones (17.4%). The mean completion time for the baseline SMART survey was 83.7 seconds (SD 45.2). After adjusting for age, sex, and education, an MCI diagnosis ($p=0.019$), lower MOCA score ($p=0.023$), and lower PACC-5 score ($p<0.001$) at baseline were associated with a longer total completion time for the SMART survey. A lower PACC-5 score was also associated with a longer completion time for the Trails A test ($p=0.002$), Trails B test ($p<0.001$), and Stroop test ($p<0.001$). We did not find any relationships between SMART survey outcomes and SUVR or CDR score. Total completion time for the SMART survey over the first 12 months of DETECT-AD significantly decreased among participants with an MCI diagnosis and at a greater magnitude than participants with normal cognition ($p<0.001$). This improvement was driven by shorter completion times for the Stroop test ($p<0.001$) over the 12 months. Monthly administration of the SMART survey was feasible in a population of older adults with and without amyloid PET positivity and total completion time was associated with several cognitive measures. There was a significant learning effect observed among cognitively impaired participants, and future analyses will incorporate SMART survey data from the second year of DETECT-AD to fully assess this learning effect.

References

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