Dual Trajectories of Depression and Cognition: A Longitudinal Population-Based Study

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Objective: *To examine the relationships over time between dual trajectories of depressive symptoms and several cognitive domains.* **Methods:** *In a 5-year longitudinal study, 1,978 randomly selected individuals aged 65+ years at recruitment were assessed annually. Repeated measures were of depressive symptoms on the modified Center for Epidemiologic Studies Depression Scale and composite scores in the cognitive domains of attention, executive function, memory, language, and visuospatial function. Latent class trajectories were identified for depression and for each cognitive domain and their associations investigated using dual trajectory modeling. Cognitive trajectories with z scores below −1 were designated as persistently low.* **Results:** *Five depressive symptom trajectories were observed: rarely depressed (60.5%); low-grade, decreasing symptoms (18.5%); low-grade, increasing symptoms (9.6%); moderate-grade symptoms (7.4%); and consistent higher-grade symptoms (4.0%). For each cognitive domain six trajectories were observed. The rarely depressed and low-grade decreasing symptom groups were the least likely to have persistently low cognition. The symptom trajectory most strongly associated with persistently low functioning in each domain was not the higher-grade group but rather the low-grade increasing group in the case of attention and the moderate-grade trajectory in the other four domains.* **Conclusion:** *Consistently higher-grade depressive symptoms are less strongly associated with poor cognitive functioning than with either moderate- or low-grade increasing depressive symptom trajectories, over time and across different domains. Examining both depression and cognition longitudinally allows heterogeneity of both to be addressed, revealing latent groups with potential diagnostic and prognostic implications.* (Am J Geriatr Psychiatry 2015; ■:■−■)

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INTRODUCTION

Depression and cognitive impairment are both common and comorbid in older adults[1–3] and have shown consistent cross-sectional associations.[4,5] Evidence is mixed as to whether depression at a given time predicts subsequent cognitive decline and at least partly depends on study sample and longitudinal methods as well as the specific outcomes assessed.[4–15] Depression has been associated with subsequent cognitive decline in studies with prospective, retrospective, and cross-lagged designs.[5–7,11,14,15] However, some prospective studies have not supported this relationship,[9,12] whereas in other studies results have depended on whether the outcome was general cognitive function or specific cognitive domains.[8,10,13]

A more dynamic view of the relationship is provided by studies that examine both depression and cognition longitudinally.[4,8,10,13,16–20] In one study a prominent association was found between depressive symptoms and cognitive decline among individuals who had already experienced cognitive decline, suggesting that depression was a possible reaction to worsening cognitive abilities.[16] An association has also been shown between the chronicity of depressive symptoms and cognitive decline.[8,10,17,18] To our knowledge, subpatterns of depressive symptomatology have not been examined longitudinally in relation to cognitive functioning.

Study results would also be expected to vary between study samples composed of patients with depressive disorders found in clinical settings and those comprising individuals in the community with varying degrees of depressive symptoms. There are selection factors that lead some, but not all, individuals with symptoms of depression and/or cognitive impairment to seek clinical services and additional factors affecting their eligibility for clinic-based research. Clinical studies usually focus on mood disorders rather than on depressive symptoms. Most studies examining the relationship between depression and cognition longitudinally have been based on community samples.[4,8,9,13,16–20] We built on this body of research by investigating trajectories of depressive symptoms and cognitive function in a prospective study of an aging population-based cohort, with over 5 years of follow-up, with the aim of determining whether any particular depressive symptom trajectory was associated with poor cognitive outcome.

METHODS

Participants

As previously reported,[21,22] the Monongahela-Youghiogheny Healthy Aging Team cohort is an age-stratified random sample drawn from publicly available voter registration lists based in a region of southwestern Pennsylvania. Recruitment criteria included age 65 or older, living within the selected area, and not already living in long-term care institutions. Individuals were ineligible if they were too ill to participate, too severely impaired in vision or hearing, or decisionally incapacitated. After initially recruiting 2,036 individuals, we excluded those with moderate to severe cognitive impairment, defined as an age-education-corrected Mini-Mental State Exam (MMSE)[23,24] score of less than 21 of 30. The remaining 1,982 individuals underwent the complete assessment at baseline and at five subsequent annual visits, for a total of six assessments.

Assessment

Neuropsychological Testing. Cognitive functioning was assessed in five domains: attention/processing speed (Trailmaking Test A, digit span), executive function (Trailmaking Test B, initial letter fluency, clock drawing), language (Boston Naming Test, category fluency, modified Token Test), memory (immediate and delayed logical memory and visual reproduction), and visuospatial skill (block design).[21,22] A composite z score was created in each cognitive domain by first standardizing each individual test score (i.e., subtracting off the baseline sample mean and dividing by the baseline sample standard deviation) and then taking the arithmetic mean of the standardized scores within each domain for each individual at each time point.

Depressive Symptom Screen. Depression was assessed using the modified Center for Epidemiologic Studies Depression Scale (mCES-D).[25,26] The participant rates 20 symptoms of depression as present or absent (score 1 or 0) over most of the