# Trajectories of Concurrent Depressive Symptoms and Cognitive Function on Health Outcomes and Mortality – Findings from a Minority Aging Population

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## Abstract

**Background:** The older population in the United States is growing and becoming more diverse. Older Hispanics represent one of the fastest growing segments of the population aged 65 and older and are projected to account for 20% of the older U.S. population by 2050 with those of Mexican origin being the largest sub-population. Data from the Hispanic EPESE has indicated older Mexican Americans have a high prevalence of depressive symptoms and increased risk of subsequent cognitive decline when clinically relevant depressive symptomatology is present. In this population, higher prevalence of functional limitations is associated with higher likelihood of hospital admissions, and higher levels of depressive symptoms and cognitive impairment are independently and significantly associated with elevated mortality risk. To date however, it is unclear how the concurrent effect of depressive symptoms and cognitive function longitudinally affects functional outcomes, health service utilization, and mortality.

The objective of this analysis was to address these gaps in knowledge through the examination of concurrent latent structure of depressive symptoms and cognitive function, and depiction of the distinctive developmental trajectory classes of both conditions during the aging process. We further examined whether these concurrent trajectories were associated with an

increased risk of functional limitations, health service utilization, and mortality over 9-year study period in Mexican Americans aged 75 years and older.

**Methods:** The Hispanic Established Populations for Epidemiologic Studies of the Elderly (Hispanic EPESE) is an ongoing longitudinal community-based study of non-institutionalized Mexican Americans 65 years and older living in Southwestern U.S. (Texas, Arizona, New Mexico, Colorado, and California). We used data collected during four observation periods from Wave 5 (2004-5) to Wave 8 (2012-13). The current analytical sample included 1,302 participants who completed the Mini-Mental Status Exam (MMSE) and the Center for Epidemiologic Studies Depression (CES-D) scale at baseline (Wave 5) and had two or more waves with measures of cognitive function and depressive symptoms.

Latent growth curve analysis was used to objectively identify distinctive concurrent trajectory classes of depressive symptoms and cognitive function over the study period. Generalized linear mixed models were employed to examine if the concurrent trajectories were associated with functional limitations (Activities of Daily Living, ADL; Instrumental Activities of Daily Living, IADL), medical visits, and hospital admission respectively. Cox proportional hazards regression was used to assess the risk of mortality as a function of the concurrent distinct trajectories.

**Results:** 1,302 followed-up participants were successfully classified into 6 distinct concurrent trajectory classes of depressive symptoms (DS) and cognitive function (CF), including 1) low-increasing DS and high CF (28.5%, reference category), 2) low-increasing DS and high-declining CF (34.6%), 3) low-increasing DS and medium-declining CF (7.1%), 4) high DS and high CF (3.2%), 5) high DS and high-declining CF (18.9%), and 6) high DS and medium-declining CF (7.8%). The average posterior probability estimates for all classes was above 0.87. In addition, participants with high depressive symptoms were most likely to experience cognitive

impairment and participants with cognitive impairment were most likely to have depressive symptoms.

Compared to concurrent low-increasing DS and high CF trajectories, participants with high DS and high- or medium-declining CF trajectories exhibited significant increases in ADL functional limitations of 57% and 97% respectively. Those with high DS and high- or medium-declining CF trajectories were 2.3 fold to 2.9 fold as likely to have more IADL functional limitations. Furthermore, those with high DS and high- or medium-declining CF trajectories exhibited significant medical visit increases of 26% to 41% respectively; and 59% and 88% increased odds of hospital admission respectively. Moreover, participants with low-increasing or high DS and high-declining CF trajectories had 58% to 73% increased risk of mortality respectively. Those with medium-declining CF concurrent with low-increasing or high DS showed an over 2-fold greater risk of mortality.

**Conclusions:** DS and CF in later life are interrelated disorders and older adults with depression are being at particularly high risk of cognitive decline. Our analyses demonstrated a strong relationship between the developmental trajectories for these two conditions over 9 years, and we observed that they increased the risk of functional limitations, health care service utilization and mortality.

As cognitive function declines and high depressive symptoms continue to be a major public health burden in the Mexican American community and aging adults at large, the findings from the present study may have significant implications for public health and clinical practice. Multi-layer interventions that focus on mental health, and the promotion of health care services for the prevention, treatment, and management of cognitive impairment and depression during the aging process may reduce the rates of older Mexican Americans experiencing functional decline or premature mortality in later life.