ELSEVIER

Alzheimer's & Dementia 9 (2013) 622–631

Alzheimer's & Dementia

Featured Article

Risk factors for mild cognitive impairment among Mexican Americans

Sid E. O'Bryant[a,b,*], Leigh Johnson[a,b], Joan Reisch[c], Melissa Edwards[d], James Hall[b,e], Robert Barber[b,f], Michael D. Devous, Sr.,[g], Donald Royall[h,i], Meharvan Singh[b,f]

[a]*Department of Internal Medicine, University of North Texas Health Sciences Center, Fort Worth, TX, USA*
[b]*Institute for Aging & Alzheimer's Disease Research, University of North Texas Health Sciences Center, Fort Worth, TX, USA*
[c]*Department of Clinical Sciences, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[d]*Department of Psychology, University of North Texas, Denton, TX, USA*
[e]*Department of Psychiatry, University of North Texas Health Sciences Center, Fort Worth, TX, USA*
[f]*Department of Pharmacology and Neuroscience, University of North Texas Health Science Center, Fort Worth, TX, USA*
[g]*Department of Radiology, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[h]*Departments of Psychiatry, Medicine, and Family & Community Medicine, University of Texas Health Science Center, San Antonio, TX, USA*
[i]*South Texas Veterans' Health System, Audie L. Murphy Division San Antonio, TX, USA*

Abstract

Background: Although a great deal of literature has focused on risk factors for mild cognitive impairment (MCI), little published work examines risk for MCI among Mexican Americans.
Methods: Data from 1628 participants (non-Hispanic $n = 1002$; Mexican American $n = 626$) were analyzed from two ongoing studies of cognitive aging and Alzheimer's disease, Project FRONTIER (Facing Rural Obstacles to health Now Through Intervention, Education & Research) and TARCC (Texas Alzheimer's Research & Care Consortium).
Results: When looking at the full cohorts (non-Hispanic and Mexican American), age, education, Apolipoprotein E (*APOE*) ε4 status and gender were consistently related to MCI diagnosis across the two cohorts. However, when split by ethnicity, advancing age was the only significant risk factor for MCI among Mexican Americans across both cohorts.
Conclusions: The current data suggest that many of the previously established risk factors for MCI among non-Hispanic cohorts may not be predictive of MCI among Mexican Americans and point to the need for additional work aimed at understanding factors related to cognitive aging among this underserved segment of the population.

Keywords: Mexican American; Mild cognitive impairment; Cognition; Alzheimer's disease; Ethnicity; Cross-cultural; Risk factors

1. Introduction

Mild cognitive impairment (MCI) is thought to reflect a transitional stage between normal cognitive aging and early dementia [1]. MCI patients demonstrate significant cognitive dysfunction in one or multiple cognitive domains, but they retain the ability to manage their daily affairs (i.e., activities of daily living). It is estimated that between 10% and 30% of all adults age 65 and above suffer from MCI [2], with 10% to 15% of MCI patients annually progressing to Alzheimer's disease (AD) [1,3,4]. The recent working group from the National Institute on Aging and the Alzheimer's Association provided revised diagnostic criteria for MCI due to AD [5] that afforded the opportunity to utilize potential biomarkers (e.g., β-amyloid [Aβ] neuroimaging, Aβ in cerebrospinal fluid [CSF], tau in CSF) to identify which MCI patients are likely to suffer from underlying AD pathology.

There are many reasons for identifying risk factors for MCI, including a generation of predictive tools for MCI/AD and identification of potentially modifiable mechanisms for reducing risk for MCI or slowing progression from MCI to AD. In fact, a sizable literature has accumulated showing that many of the primary factors related to AD are also significantly related to MCI risk, including age [6–8], education

*Corresponding author. Tel.: 817-735-2961; Fax: 817-735-0611.
E-mail address: Sid.O'Bryant@unthsc.edu

1552-5260/$ - see front matter © 2013 The Alzheimer's Association. All rights reserved.
http://dx.doi.org/10.1016/j.jalz.2012.12.007

[7,8], gender [7,8], Apolipoprotein E (*APOE*) ε4 genotype [6,7], hypertension and heart disease [6,9,10], diabetes [11,12], and depression [6,12,13]. Although there has been a surge in research over the last decade on the topic of MCI, there is a paucity of literature available on this construct among Hispanics residing within the United States [14]. The population of U.S. Hispanics ages 65 and above will triple by the year 2050 [15], with the rates of AD expected to grow sixfold [16]. Given that approximately 65% of the U.S. Hispanic population is Mexican American [17], this is the fastest aging segment of the population. Therefore, a tremendous need exists for research examining the construct of MCI, as well as dementia, among this underserved ethnic group [16,18–20].

There is sufficient evidence to expect that MCI may differ among Mexican Americans as compared with non-Hispanics. The available AD/dementia literature suggests that Mexican Americans are diagnosed at more advanced stages of disease progression [19], are diagnosed at younger ages [19], are less likely to carry the *APOE* ε4 allele [21], and suffer from a disproportionate burden of modifiable risk factors (e.g., diabetes, depression) [19,22]. The purpose of this study was to determine if the previously identified risk factors for MCI among non-Hispanic cohorts were applicable to Mexican Americans.

2. Methods

2.1. Participants

Data from 1628 participants (non-Hispanic $n = 1002$; Mexican American $n = 626$) were analyzed from two ongoing studies of cognitive aging and AD, Project FRONTIER (Facing Rural Obstacles to health Now Through Intervention, Education & Research) and TARCC (Texas Alzheimer's Research & Care Consortium).

2.1.1. Project FRONTIER

Data from 509 participants (normal control [NC] $n = 410$, MCI $n = 99$) were analyzed. Project FRONTIER is a community-based epidemiological study of rural cognitive aging that uses a community-based participatory research (CBPR) approach. CBPR involves partnering communities with scientific groups to conduct studies of human disease. CBPR is particularly useful when working with underserved communities that may not respond to classic approaches (e.g., random digit dialing, mail surveys) and is supported by the National Institute of Environmental Health Sciences [23]. Partnerships were created with the local hospitals and clinics as well as other community (e.g., senior citizens' centers) organizations. Community recruiters and research personnel presented information about the study at community events, churches, and food banks as well as through door-to-door solicitation. Prior work from this study has demonstrated the comparability of the recruited cohort to that of the eligible population [24,25]. Inclusion criteria were being age 40 and above and residing in one of the counties included in the study (Cochran, Bailey, or Parmer County, Texas).

2.1.2. TARCC

Data from 1098 participants (NC = 774; MCI $n = 325$) were analyzed. Participants completed a standardized examination at one of the five participating site dementia specialty clinics (Texas Tech University Health Sciences Center, University of North Texas Health Science Center, University of Texas Southwestern Medical Center, University of Texas Health Science Center–San Antonio, and Baylor College of Medicine). Inclusion criteria for TARCC are being age 50 or above with a diagnosis of probable AD [26], MCI [27], or NC [28]; a Mini-Mental State Exam (MMSE) score of 11 or greater (at entry); and an available informant. Participants are excluded if their Hachinski ischemic score is greater than 4; they have a history of stroke; or if they have current cancer, neurological disease (e.g., Parkinson's disease), acute inflammatory disorders (multiple sclerosis, rheumatoid arthritis), or urinary infections. Data from both of these studies have been published extensively elsewhere [24,25]. This research was conducted under institutional research board approved protocols with each participant (and/or informants for cognitively impaired persons) providing written informed consent.

2.2. Procedures

All participants underwent an examination that included a medical evaluation, neuropsychological testing, and an interview according to a standardized protocol. Additionally, each participant provided blood for storage in the respective biobanks. The cognitive examination included the MMSE, the Clinical Dementia Rating (CDR) scale, and detailed neuropsychological testing (e.g., Wechsler Memory Scale Logical Memory and Visual Reproduction [TARCC only], Consortium to Establish a Registry for Alzheimer's Disease [CERAD] List Learning and Memory [TARCC only], Trail Making Test, verbal fluency [FAS], animal naming, clock drawing, Boston naming test, Repeatable Battery for the Assessment of Neuropsychological Status [RBANS, FRONTIER only], and Exit Interview [EXIT25, FRONTIER only]). Diagnoses were assigned according to standardized criteria for MCI [27] or NC [28] by consensus review by physicians and neuropsychologists. Diagnoses of hypertension, hyperlipidemia, diabetes, and current obesity were as follows: hyperlipidemia as defined by self-report or use of cholesterol-lowering agents or total serum cholesterol greater than 220 mg/dL or low-density lipoprotein levels greater than 140 mg/dL; diabetes mellitus as defined by self-report or history of treatment for diabetes with insulin or oral hypoglycemic agent or fasting glucose levels greater than 126 mg/dL; hypertension as defined by self-report or use of antihypertensive medications or documented systolic blood pressure greater than 140 mmHg or diastolic blood pressure greater than 90