UCSF Weill Institute for Neurosciences

Memory and Aging Center

Alzheimer Disease-Associated Cortical Atrophy Does Not Differ Between Chinese and Whites

J Fan[1,3], M Tse[1], JS Carr[1], BL Miller[1], JH Kramer[1], HJ Rosen[1], LW Bonham[1,2*], **JS Yokoyama**[1*]

Departments of [1]Neurology, Memory and Aging Center; [2]Radiology and Biomedical Imaging, University of California, San Francisco, San Francisco, CA; and [3]Department of Neurology, Second Hospital, Jilin University, Changchun, Jilin, China. **equal contribution*

Introduction

Goals:

1. Examine association between clinical severity [assessed with Clinical Dementia Rating Sum of Boxes (CDR-SB)] and gray matter (GM) volume loss in Chinese and white individuals
2. Assess whether there are atrophy differences in AD-associated regions between the two groups across the AD spectrum.

Importance:

Population-specific differences could impact interpretation of research or clinical trials utilizing diverse participants, particularly if clinical or neuroimaging measures are used to assess treatment outcome.

Methods

- Participants were recruited from the UCSF Memory and Aging Center ADRC under IRB-approved protocol. 48 Chinese and 46 white individuals were selected to be matched by diagnosis for sex, age and education to reduce confounding
- Participants were clinically and cognitively assessed in English, Cantonese, or Mandarin based on their preference
- T1-weignted MR images were processed using two methods to ensure robust findings: (a) DARTEL-processed using SPM 12 for voxel-based morphology (VBM) and (b) parcellation using FreeSurfer v5.3 for cortical thickness extraction using the Desikan-Kiliany atlas

Results

- Chinese and white individuals showed similar levels of clinical severity when comparing CDR-SB scores by diagnosis (**Figure 1**)
- Chinese and white Alzheimer's disease (AD) and mild cognitive impairment (MCI) patients showed common areas of atrophy compared to healthy controls (CN) using VBM and FreeSurfer
- There was no significant difference between groups when comparing the relationship between CDR-SB score and atrophy (**Figure 2**); the relationship was similar using both SPM and FreeSurfer data

Discussion

Our findings suggest that, when matched demographically, clinical and neuroimaging data from Chinese and white individuals can be combined and analyzed as a single group without confounding due to differential disease effects by racial groupings.

Our study provides cross-sectional evidence that **Chinese and white** individuals show the **same** disease-associated neuroimaging and clinical severity patterns across the AD spectrum.

This research highlights the **importance** of implementing strategies to **improve diversity** in clinical research and therapeutic trials.

Scan code to access the full article

Fan, et al. (2019) *Alzheimer Dis Assoc Disord*

If you cannot access this article through your institution, please request a copy:

Jennifer.Yokoyama@ucsf.edu https://yokoyamalab.ucsf.edu

Figure 1

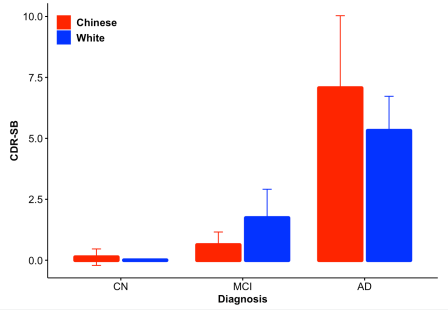
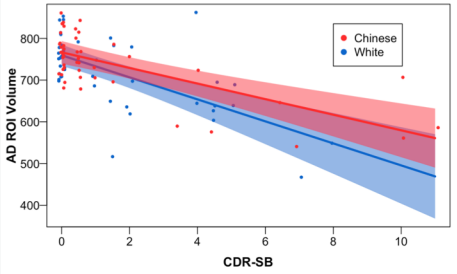


Figure 2



Acknowledgements: NIA K01 AG049152 (JSY), Larry L. Hillblom Foundation 2016-A-005-SUP (JSY), Tau Consortium (JSY), Bluefield Project to Cure FTD (JSY), John Douglas French Alzheimer's Foundation (JSY), and Radiological Society of North America (RSNA) RMS1741 (LWB), NIH grants P50-AG023501 and P01-AG1972403 (BLM), the Larry L. Hillblom Foundation (JHK), and the National Center for Advancing Translational Sciences of the NIH under Award Number TL1 TR001871 (JSC).