Impact of persistent depression symptom and telomere length on cognitive decline and white matter alteration in aging adults

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INTRODUCTION

- Previous studies have reported major depressive disorder (MDD) has been associated with telomere length shortening and alterations in cognitive decline.
- The aim of this study was to investigate the cognitive decline and possible cerebral modification of white matter integrity on persistent depression symptoms with telomere length differences using diffusion tensor imaging (DTI).

METHODS

Participants

- Total 1898 cognitively normal adults (49-80 years, mean age: 59.27 ± 6.89) without neurological illnesses from Korean Genome Epidemiology Study (944 women and 954 men).
- Participants were divided into one of six groups base on the result from Beck's Depression Inventory(BDI; 3: persistent depression, changed depression, persistent normal) and Telomere length (2: Short, Long).
  - ✓ BDI was measured twice in two years : persistent depression (1st BDI > 13 & 2nd BDI > 13); changed depression (1st BDI ≤ 13 & 2nd BDI > 13); persistent normal (1st BDI ≤ 13 & 2nd BDI ≤ 13)

Cognitive measures

- Neuropsychological test battery that included Digit Symbol Test, Verbal Fluency, Visual Recall Test.

Image acquisition

- Brain imaging examinations were performed with 1.5 T MRI (GE Signa HDxt 1.5 T MRI scanner)
- Diffusion gradients (b value of 1000 s/mm^2) were applied along 16 directions.

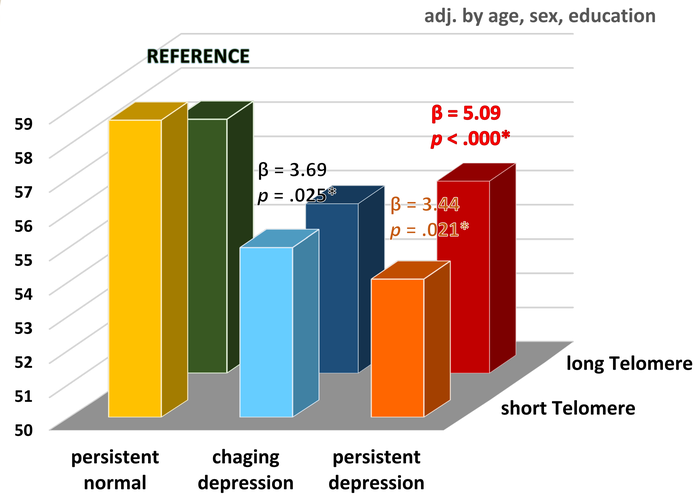
Statistical Analysis

- The imaging data were processed using FSL´s Diffusion Toolbox (v 6.0.1); Tract Based Spatial Statistics (TBSS).
- The cognitive functions were analyzed using multivariate linear regression after adjustment age, sex, education.

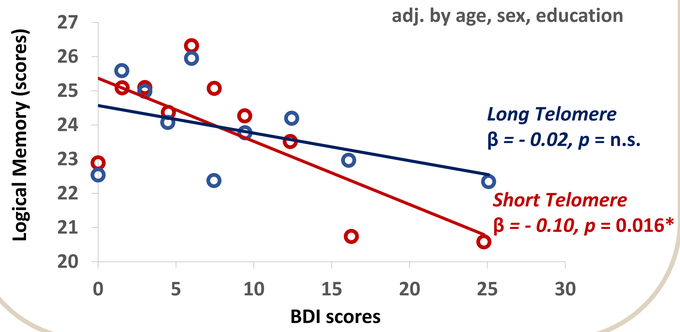
RESULTS

Cognitive Test Results

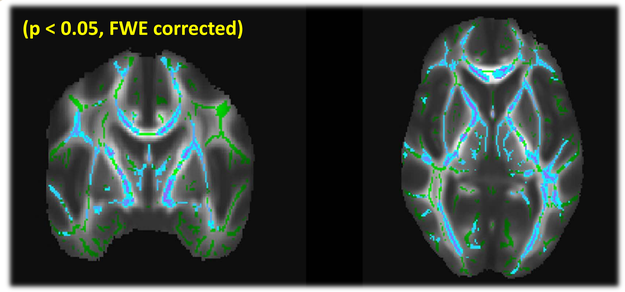
Digit Symbol Test - Coding



Logical Memory Test

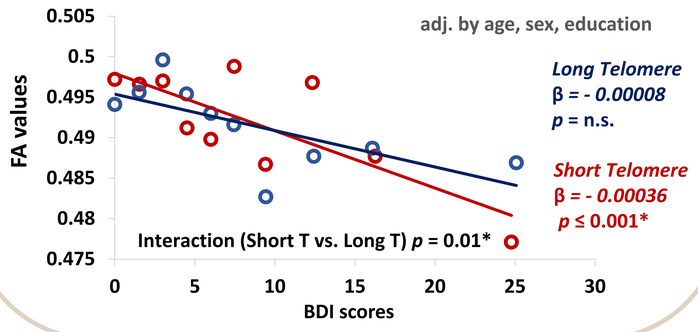


Brain Imaging Results



- ➢ Blue clusters is depicting negative correlations between fractional anisotropy (FA) values and BDI scores.
- ➢ The mean FA in those brain areas was significantly decreased with depression symptoms in shorter telomere groups.

Anatomical regions	Hem.	size	x	y	z
Anterior thalamic radiation	L	4741	-5	-37	-30
Inferior fronto-occipital fasciculus	R	438	34	-33	7
Superior longitudinal fasciculus	L	116	-45	-41	17



DISCUSSION

We found synergetic interaction between persistent depression symptoms and telomere length on cognitive function and white matter alteration. These findings provide an evidence for the high risk of developing incident AD and MCI in aging adults with depression symptoms.

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