

Activities of daily living and MRI volumetric measures in Alzheimer’s disease: insights from the AIBL cohort.



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Hippocampal volume was significantly associated with ADL performance

INTRODUCTION

- Alzheimer’s disease is characterised by progressive neurodegeneration, including amyloid plaques, tau tangles and brain atrophy.
- Loss of independence in activities of daily living (ADL) is a core clinical feature of Alzheimer’s disease dementia and affects quality of life.
- Structural brain changes on MRI may be linked to loss of independence in daily activities.
- There is a gap in whether the decline in daily functioning is associated with global atrophy or region-specific neurodegeneration.

CONCLUSION

- In MCI or AD, reduced independence in daily activities was more strongly associated with hippocampal atrophy than with broader measures of brain volume.
- No other volumetric measure was significantly associated with ADL.

CLINICAL IMPLICATIONS

- ADL measures capture a meaningful decline in functional performance in AD.
- Hippocampal integrity may uniquely contribute to maintaining everyday independence in AD beyond global disease severity.

LIMITATIONS

- Cross-sectional design
- Modest sample size
- ADL performance ratings may vary
- Longitudinal validation needed

CONTACT

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METHODS

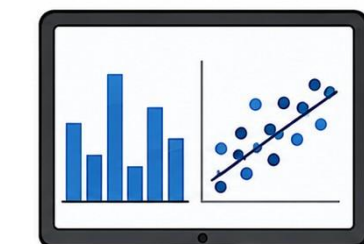
ASSESSMENTS

-  **Daily functioning**
Activities of Daily Living inventory (AIBL-ADLi) (0 - 78 total score; higher = greater independence)
-  **Structural MRI**
MRI scan volumetric measures corrected for intracranial volume
-  **Amyloid PET**
Amyloid burden quantified to derive Centiloid (continuous measure)
-  **Genetics**
APOE ε4 genotype from blood (carrier vs. non-carrier)
-  **Cognitive & clinical measures**
CDR, MMSE clinical classification: (MCI; *n* = 17; AD; *n* = 72)

COVARIATES

-  **Age** (years)
-  **Sex** (male/female)
-  **Education** (> 12 years: yes/no)
-  **Cognition** (MMSE score)
-  ***APOE* ε4 status** (carrier/non-carrier)
-  **Amyloid PET burden** (Centiloid, continuous)
-  **Clinical classification** (MCI/AD)

AIBL COHORT OVERVIEW

-  **AIBL cohort**
Cross-sectional analysis of AIBL participants Aged ≥ 60 years (2011 - 2020)
 -  **MRI +ADL assessments**
MRI scans, AIBL-ADLi
 -  **Clinical and genetic data** (e.g. *APOE* ε4, status, cognition, demographics)
 -  **Regression analyses**
association between ADL, and brain volume measures
-
-  **N = 88**
 -  **Mean age**
76 years
 -  **70%**
*APOE*ε4 carriers
 -  **MCI or AD**
(CDR = 0.5 or ≥1)

RESULTS

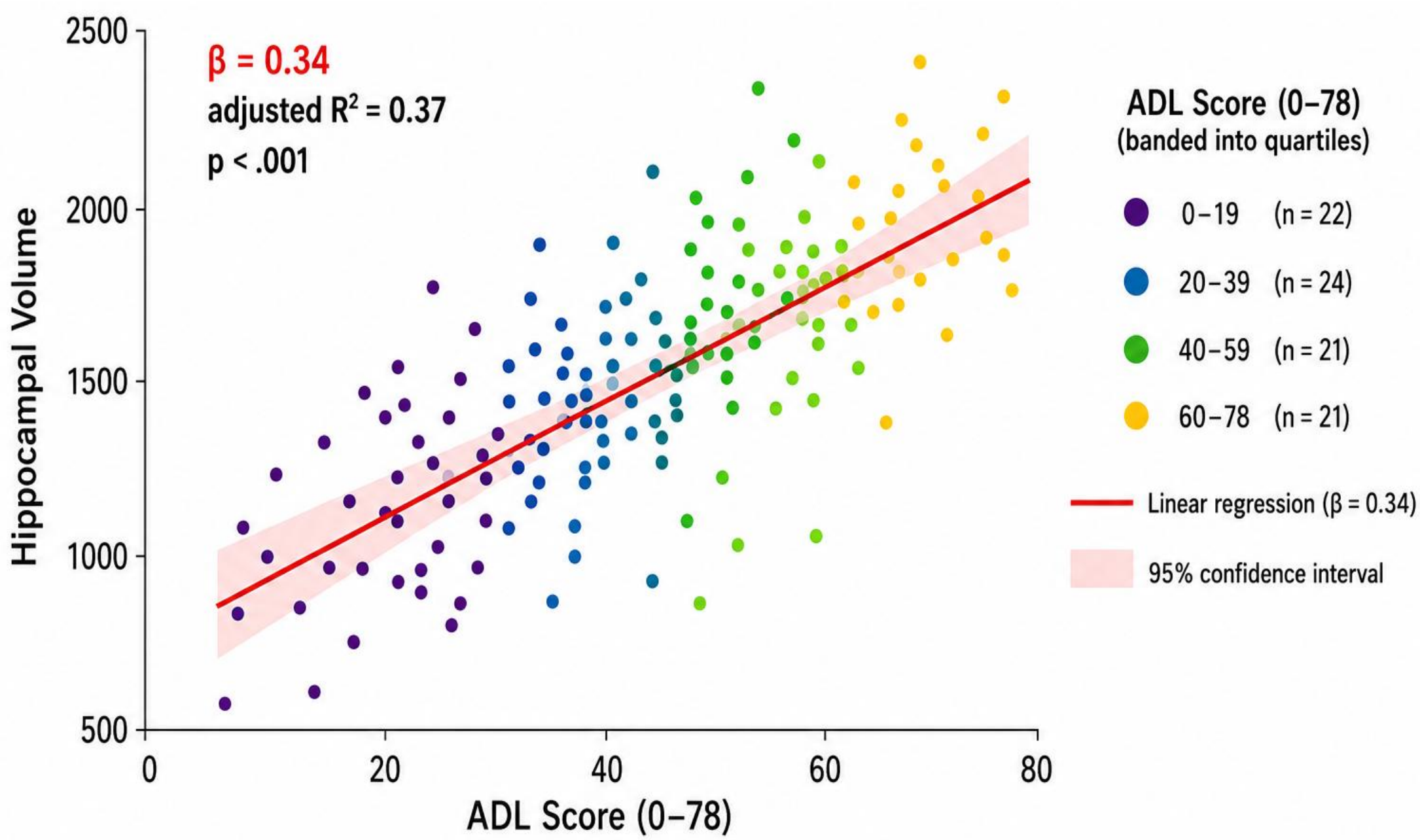
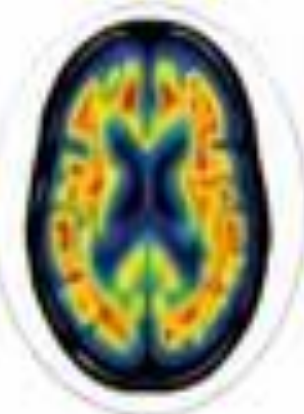


Figure 1. The relationship between ADL score and hippocampal volume. Each point represents one participant (*n* = 88). Higher ADL scores indicate greater independence in daily activities. The shaded area represents the 95% CI.



Hippocampal integrity uniquely relates to ADL

- Higher ADL scores were associated with greater hippocampal volume, independent of age, sex, amyloid burden, and clinical classification (β = 0.34, p < .001; adjusted R^2 = 0.37).



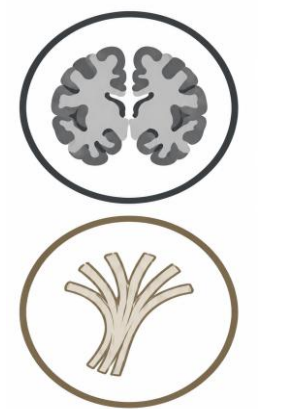
Association persists after adjusting for amyloid burden

- Findings remained significant after controlling for PET amyloid (Centiloid scale), age, sex, and clinical classification.



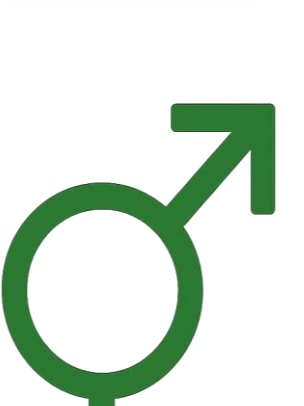
Decline in ADL may be more closely associated with region-specific neurodegeneration

- ADL performance was not associated with global grey or white matter atrophy or ventricular enlargement.



Associations were specific to hippocampal volume

- ADL performance was not significantly associated with grey matter, white matter volume, or ventricular volume after correction for multiple comparisons.



Sex stratified results

- Higher ADL scores were associated with greater hippocampal volume in males (β = .36, p = .001), while a similar but non-significant trend was observed in females (β = .29, p = .057).

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