



Title	Characteristics of the Japanese version of the Alzheimer's Disease Cooperative Study Scale for Activities of Daily Living in Mild Cognitive Impairment (ADCS-MCI-ADL-J): preliminary data
Author(s)	Ishimaru, Daiki; Suzuki, Maki; Katsuki, Kunihiro et al.
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NOTE

Characteristics of the Japanese version of the Alzheimer's Disease Cooperative Study Scale for Activities of Daily Living in Mild Cognitive Impairment (ADCS-MCI-ADL-J): preliminary data

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Mild cognitive impairment (MCI) is a transitional state between normal ageing and dementia in cognition and daily function. Patients with MCI initially exhibit a subtle decline in efficiency and/or accuracy in performing activities of daily living (ADL), particularly in those requiring complex cognitive functions, such as financial management and food preparation.^{1,2} These activities, referred to as instrumental ADL (IADL), are affected prior to basic ADL (BADL) such as dressing and bathing. Patients with Alzheimer's disease (AD) dementia (ADD) demonstrate a decline in both BADL and IADL.¹ Given the continuous nature of normal ageing, MCI, and dementia, there is a need for an evaluation scale that can accurately capture the subtle impairments of ADL to provide early and effective treatment/support. Furthermore, the recent development of disease-modifying therapies for AD has highlighted the need for appropriate ADL assessment tools capable of measuring the effects of treatments on MCI.³

The Lawton IADL scale and Physical Self-Maintenance Scale (PSMS) are the two most widely used instruments for ADL assessment in clinical practice. However, as these scales are designed to assess the degree of independence in performing ADL with few (six or eight) questions, identifying the subtle impairments observed in patients with MCI in detail is often challenging. The Alzheimer's Disease Cooperative Study scale for Activities of Daily Living in Mild Cognitive Impairment (ADCS-MCI-ADL) is an adapted version of the ADCS-ADL, which is widely used in clinical practice and clinical trials in several countries to measure ADL in patients with MCI.⁴ It is based on a semi-structured interview with informants/caregivers. The scale not only assesses independence but also accuracies or errors in IADL that seem to be difficult for patients with MCI, such as checking bank

accounts or keeping appointments. It consists of 18 scored questions and six additional (unscored) questions. Higher scores indicate better ADL, with the maximum possible total score being 53.

Herein, we present preliminary findings from our ongoing research on the standardisation of the Japanese version of the ADCS-MCI-ADL (ADCS-MCI-ADL-J). The presented findings are based on group comparisons of data from the ADCS-MCI-ADL-J, Lawton IADL, and PSMS administered to patients diagnosed with MCI due to AD or mild ADD. We translated the ADCS-MCI-ADL into Japanese following the guidelines of the International Society for Pharmacoeconomics and Outcomes Research task force.⁵

Participants were patients with MCI due to AD and mild ADD and their caregivers who visited the outpatient clinic in the Department of Psychiatry at Osaka University Hospital and Asakayama Hospital from March 11 to June 12, 2024. The inclusion criteria were: (1) diagnosis of MCI due to AD or ADD according to the National Institute on Aging-Alzheimer's Association 2011 criteria;^{6,7} (2) clinical dementia rating global score = 0.5 or 1; and (3) age ≥ 40 years. The exclusion criteria were the presence of severe physical and/or psychiatric comorbidities that could clearly impair cognition or physical performance. The ADCS-MCA-ADL-J was individually administered to the caregivers by one of the evaluators. Additionally, all patients were evaluated using the Clinical Dementia Rating (CDR) scale to measure dementia severity, Mini-Mental State Examination-Japanese (MMSE-J) for cognitive function, Lawton IADL scale for IADL, and PSMS for BADL. The possible range of total scores was 0–8 for the Lawton IADL scale and 0–6 for the PSMS. The Lawton IADL scale traditionally employs a varying number of items

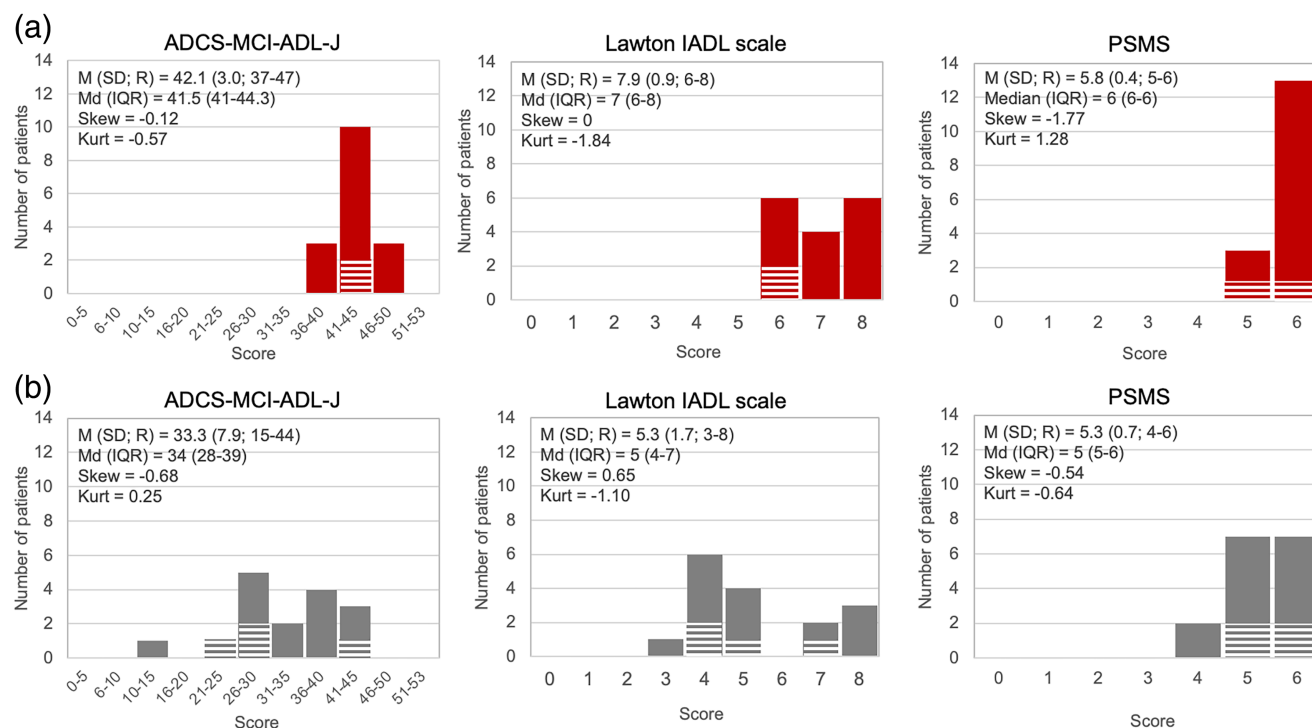


Figure 1 Basic statistical values and histogram of scores for each ADL scale. Data from patients with MCI due to AD (a) and mild ADD (b). Bars with horizontal lines represent male patients. The scores were distributed in the upper range of the Lawton IADL scale and PSMS, except those of the ADCS-MCI-ADL-J. M, mean; SD, standard deviation; R, range; Md, median; IQR, interquartile range; Skew, skewness; Kurt, kurtosis; MCI due to AD, mild cognitive impairment due to Alzheimer's disease; ADD, Alzheimer's disease dementia; ADCS-MCI-ADL-J, Japanese version of the Alzheimer's Disease Cooperative Study Scale for Activities of Daily Living in Mild Cognitive Impairment; Lawton IADL, Instrumental Activities of Daily Living; PSMS, Physical Self-Maintenance Scale.

for scoring by sex. However, in this study, all eight items were assessed regardless of sex. Statistical analysis was performed using Pearson's Chi-square test for sex and Mann-Whitney *U*-test for age, CDR global score, CDR sum of boxes (CDR SoB), MMSE-J, and each ADL scale to compare MCI in AD and mild ADD groups.

A total of 32 participants were assessed, comprising 16 patients with MCI due to AD (mean (standard deviation (SD)) age = 74.4 (8.0) years, range = 54–86 years; 14 females) and 16 patients with mild ADD (mean (SD) age = 74.9 (9.0) years, range = 54–89 years; 12 females). Age and sex did not significantly differ between the two groups ($P = 0.985$, $P = 0.365$, respectively). The severity of dementia and cognitive function were found to be more pronounced in participants with ADD (MCI due to AD: mean (SD) CDR global score = 0.5 (0); CDR SoB score = 2.7 (0.9); MMSE-J score = 25.8 (2.3); mild ADD: mean (SD) CDR global score = 0.8 (0.2); CDR SoB score = 5.0 (1.2); MMSE-J score = 21.7 (3.0); all $P < 0.001$).

Figure 1 shows the basic statistical values and histograms of the ADCS-MCI-ADL-J, Lawton IADL scale, and PSMS scores by diagnosis group. A comparison of each ADL scale revealed significant differences between two diagnosis groups in ADCS-MCI-ADL-J ($P < 0.001$) and Lawton IADL scales ($P = 0.005$) but not in PSMS ($P = 0.056$). A visual review of the data indicated that the Lawton IADL scale scores were within the high range (score range: 6–8) for patients with MCI due to AD, whereas the ADCS-MCI-ADL-J scores appeared to be within the moderate-to-high range, showing a wider distribution (score range: 37–47). The Lawton IADL scale score showed a bimodal distribution, especially in the mild ADD group. Unfortunately, we only have a small sample size, making it difficult for us to provide a meaningful discussion at this stage. The PSMS scores were high for both MCI due to AD and mild ADD (score ranges: 6–8, 3–8, respectively). In the ADCS-MCI-ADL-J, none of the patients with MCI due to AD achieved the highest possible scores. In contrast, six (38%) patients with MCI due to AD and

13 (81%) with MCI due to AD reached the top score on the Lawton IADL scale and PSMS, respectively, indicating the presence of ceiling effects.

In conclusion, our preliminary data indicate that while both the ADCS-MCI-ADL-J and Lawton IADL scales could differentiate between MCI due to AD and mild ADD, the ADCS-MCI-ADL-J had the advantage of being able to assess the ADL performance of patients with MCI due to AD with a wider score range without ceiling effects.

AUTHOR CONTRIBUTIONS

DI, YN, KK, MS, and KH translated the manuscript into English. DI, KS, YN, MS, NH, HK, KK, YS, DT, KY, and MI examined patients. DI and MS analyzed the data, and DI drafted the manuscript. All authors have read and revised the manuscript. All the authors approved the final version of this manuscript.

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DISCLOSURE

The authors have no potential conflicts of interest to disclose.

ETHICS STATEMENT

This study was approved by the Osaka University Clinical Research Review Committee (23 274(T2)-3)

and was registered with the UMIN-CTR (UMIN000055015).

PATIENT CONSENT STATEMENT

Written informed consent was obtained from patients and/or caregivers.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Daiki Ishimaru^{1,2}, Maki Suzuki^{2,3}, Kunihiro Katsuki^{1,2}, Yuma Nagata^{1,2}, Natsuho Hirakawa³, Daiki Taomoto², Yuto Satake^{1,2}, Kenji Yoshiyama², Kazue Shigenobu^{3,4}, Hideki Kanemoto^{1,5} and Manabu Ikeda²

¹Department of Medical Technology, Osaka University Hospital, ²Department of Psychiatry, Osaka University Graduate School of Medicine, ³Department of Behavioural Neurology and Neuropsychiatry, Osaka University United Graduate School of Child Development, ⁴Department of Psychiatry, Asakayama General Hospital and ⁵Health and Counselling Centre, Osaka University, Osaka, Japan

Correspondence: Dr. Daiki Ishimaru PhD, Department of Medical Technology, Osaka University Hospital, 2-15, Yamadaoka, Suita-city, Osaka, 565-0871, Japan. Email: d.ishimaru@psy.med.osaka-u.ac.jp

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