

Determinants of Completion and Dropout in a Community-Based Smartphone Cognitive Intervention for Older Adults

#6218

Byung Hun Yun, M.S.^{1,3}, Bo Hee Kim, M.S.⁴, Whani Kim, M.S.¹, Hyun Jeong Ko, M.S.¹, Ko Eun Shim B.A.^{1,3}, So Yoon Park, M.S.^{1,3}, Jin Sung Kim, M.S.², Yu Young Kim, Ph.D.^{1,3}, Sang Kwon Lim, B.S.¹, Bo Ri Kim, Ph.D.⁵, Jee Hang Lee, Ph.D.^{2,7*}, Geon Ha Kim, MD, Ph.D.^{5,6*}, and Jinwoo Kim, Ph.D.^{1,3}

¹Hall Corp., Seoul, Republic of Korea; ²Sangmyung University, Seoul, Republic of Korea; ³Yonsei University, Seoul, Republic of Korea; ⁴LG Electronics, Seoul, Republic of Korea; ⁵Ewha Womans University, Seoul, Republic of Korea; ⁶Ewha Womans University Mokdong Hospital, Ewha Womans University College of Medicine, Seoul, Republic of Korea; ⁷Institute for Advanced Intelligence Study, Daejeon, Republic of Korea * Co-corresponding authors: geonha@ewha.ac.kr, jeehang@smu.ac.kr

Background

- **Smartphone-based cognitive interventions can support cognitive health in older adults** ^[1], but **adherence is inconsistent**, often depending on digital familiarity and available assistance ^[2].
- **Education and household composition** might shape engagement, yet evidence from large community-based samples remains limited ^[3,4].
- This study compared completers and dropouts across two community-based mobile cognitive intervention studies (2022, 2024).

Methods

- **349 adults aged 55–85** completed a **3-month mobile-based dementia prevention program** via local welfare centers in Korea (two studies, 2022/2024); **258 completed, 91 dropped out**.
- Compared **between groups: demographics (age, sex, education, household composition — living alone/spouse/family), cognitive function (K-MMSE), and social support (MOS-SSS)**.
- Analysis: chi-square/Fisher’s exact tests (categorical), independent-samples t-tests (continuous).

Results

Completion was associated with education and household composition, but not sex or age.

- **Sex and age did not differ between completers and dropouts** (41.2% vs. 46.7%; $p=0.371$; mean age: 69.98 vs. 69.72 years; $p=.819$).
- **Completers had higher educational attainment:** more college-educated (16.5% vs. 4.4%) and fewer with ≤elementary education (34.4% vs. 45.6%) than dropouts ($p<.05$).
- **Living alone was strongly linked to dropout:** only 5.0% of completers lived alone vs. 42.9% of dropout; family co-residence occurred only among completers (24.8% vs. 0%) ($p<.01$).
- Caveat: household composition data available only from the 2022 cohort; limits generalizability.

Characteristics	Completed	Drop-out	Total	Chi-square (df)	t (df)	p-value
Gender, n	n=257	n=90	n=347	0.801(1)		0.371
Male, n (%)	106 (41.2)	42 (46.7)	148 (42.7)			
Female, n (%)	151 (58.8)	48 (53.3)	199 (57.3)			
Age (years), n	n=257	n=72	n=329		0.229 (327)	0.819
Mean (SD)	69.98±8.68	69.72±7.65	69.92±8.46			
< 60, n (%)	32 (12.5)	7 (9.7)	39 (11.9)			
60-69, n (%)	98 (38.1)	28 (38.9)	126 (38.3)			
70-79, n (%)	85 (33.1)	31 (43.1)	116 (35.3)			
≥ 80, n (%)	42 (16.3)	6 (8.3)	48 (14.6)			

Characteristics	Completed	Drop-out	Total	Chi-square (df)	t (df)	p-value
Highest education qualification, n	n=218	n=68	n=286		2.250 (284)	<0.05*
< Elementary, n (%)	75 (34.4)	31 (45.6)	106 (37.1)			
Middle School, n (%)	51 (23.4)	18 (26.5)	69 (24.1)			
High School, n (%)	56 (25.7)	16 (23.5)	72 (25.2)			
≥ College, n (%)	36 (16.5)	3 (4.4)	39 (13.6)			
Household Composition, n	n=121	n=7	n=128			<0.01**
Living Alone, n (%)	6 (5.0)	3 (42.9)	9 (7.0)			
With Spouse, n (%)	85 (70.2)	4 (57.1)	89 (69.5)			
Family, n (%)	30 (24.8)	0 (0.0)	30 (23.4)			

Completion was not associated with baseline K-MMSE and MOS-SSS.

- **Baseline cognitive function and social support did not differ by completion status.** K-MMSE: 25.43 vs. 25.54 ($p=.870$); MOS-SSS: 71.38 vs. 76.27 ($p = 0.136$) — neither reached significance.
- Caveat: baseline data lost to first-visit no-shows/withdrawal before assessment.

Parameters	Number of People	Mean (SD)	Hedge’s g	t	p-value
Baseline K-MMSE Score (n=311)					
Completed	255	25.43 (4.63)			
Drop-out	56	25.54 (3.71)	0.02	-0.164	0.870
Baseline MOS-SSS Score (n=294)					
Completed	249	71.38 (20.49)			
Drop-out	45	76.27 (18.36)	20.23	-1.496	0.136

Conclusions

- **Higher education and supportive household arrangements were associated with intervention completion, consistent with prior work** ^[5,6] — likely reflecting greater digital literacy and learning motivation among higher-educated participants ^[12,14], and practical support (reminders, app setup help, troubleshooting) from spouses, children, or grandchildren ^[5-8].
- **Age and baseline cognitive function were not significant predictors, despite prior evidence linking older age and lower cognition to higher dropout** ^[9,10] — likely reflecting the sample: few participants had cognitive impairment, and recruitment criteria (community-dwelling, monthly center visits) may have excluded those with mobility limitations, narrowing the range represented.

Implication

- **Participants living alone may benefit from structured adherence support — initial and ongoing guidance, weekly check-ins, and coaching — to reinforce a sense of responsibility for completion** ^[11-13].
- **Participants with lower education may need onboarding designed for low digital literacy, including step-by-step tutorials and repeated hands-on guidance** ^[14,15].
- **Task difficulty should be tailored to educational level, with graded difficulty (easy → hard) to support achievable challenge and reduce frustration** ^[16,17].
- **Future studies should recruit more cognitively impaired and older (≥75) participants, and use baseline screening to identify high-risk profiles (living alone, older age, lower education) for targeted onboarding and adherence support.**