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PROFESSIONAL EXPERIENCE

2024.01 ~ 현재

Clinical Research Coordinator

가톨릭관동대학교 국제성모병원 | 재활의학과

핵심 성과

- **3.9**억 원 규모 다기관 R&D 프로젝트 총괄 관리
- **SCI**급 논문 공동저자 **1**편 게재 (Frontiers in Neurology) + 제1저자 논문 1편 Accept TBA(accepted 8 December, 2025).
- 국내 학회 포스터 발표 **2**건 (대한재활의학회 추계학술대회)
- 보건복지부·한국보건산업진흥원 실증사업 중간보고회 **Q&A** 세션 진행

보건복지부 첨단의료지원관 국장, 의료정보정책과장, 보건산업진흥원 바이오헬스혁신본부장 등 주요 인사 참석, 디지털 헬스케어 실증 연구 관련 질의응답 진행

주요 업무

- AI 기반 디지털 인지훈련 치료제 다기관 무작위대조 임상시험(MCI·뇌졸중 대상) 총괄
- 대상자 모집·선정, IRB 심의, CRIS 등록, 연구비 집행 및 보고서 작성
- 임상시험 문서 관리, 데이터 품질 점검, 연구 진행 모니터링
- 교수진·간호사·치료사 등 다직종 협업을 통한 연구 프로세스 구축 및 개선
- 학술 논문 작성 및 학회 발표

2025.02 ~ 2025.08

Clinical Research Associate (프리랜서)

(주)플코스킨 | 계약 만료

- 임상시험 초기 IRB 문서 검토

EDUCATION & CERTIFICATIONS

2017.03 ~ 2023.02

전남과학대학교 | 간호학과 학사
간호사 면허 (No.494848) | 보건복지부 (2023.02)

PUBLICATIONS

1. AI-driven cognitive telerehabilitation for stroke: a randomized controlled trial

Frontiers in Neurology | Published: August 14, 2025 (공저자)

뇌졸중 환자를 위한 AI 기반 인지 원격재활의 임상 효과를 다기관 무작위 대조시험을 통해 검증한 연구로, AI 재활이 치료사 감독형 재활과 동등한 인지 개선 효과를 보였음을 입증함

2. Designing a Generative AI Framework for Cognitive Intervention in Older Adults: An Engineering Protocol for Clinical Application

MDPI | Published: December 10, 2025) (제1저자)

고령자의 인지기능 저하와 디지털 배제를 해결하기 위해 생성형 AI 기반 3중 에이전트(Coach-Teacher-Companion) 시스템을 설계하고, 일상생활 속 자연스러운 인지훈련 흐름(Context-Adaptive Cognitive Flow)을 구현

공동 제*1*저자*:* 황건휘 *(*홋카이도대학교 응용물리학 박사과정*)* | 교신저자*:* 김두영 교수 *(*가톨릭관동대 국제성모병원 재활의학과*)*

3. Artificial Intelligence-Guided Mobile Telerehabilitation for Individuals with Cognitive Impairment: A Feasibility Study

ARM | Under review (공저자)

AI 기반 모바일 인지 원격재활(Zenicog®) 프로그램이 경도인지장애·뇌졸중 환자에서 실행 가능하며 인지 기능 개선 효과가 잠재적으로 확인된다는 내용의 임상적 타당성 연구.

PROFESSIONAL DEVELOPMENT

교육 **&** 자격

- 임상시험 모니터요원**(CRA)** 신규자 과정 **(1200**분**)** | KONECT 국가임상시험지원재단 (2025.02)
- 임상연구와 **AI** | 고려대학교 의료원 (2024.07)
- **Leadership** | LinkedIn Learning (2024.05)
- **Communication & Leadership** | LinkedIn Learning (2024.05)

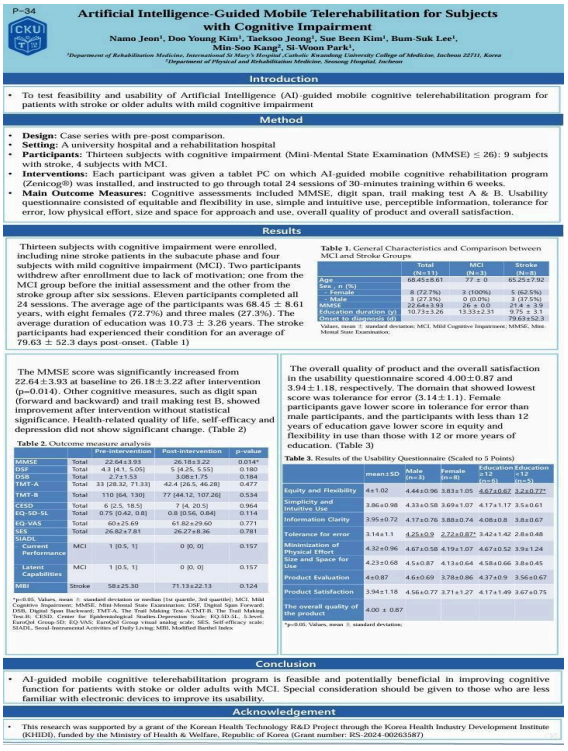
학회 참석

■ 대한재활의학회 춘계·추계 국제학술대회 (2024~2025, 총 4회)

CONFERENCE PRESENTATIONS

2024 추계 대한재활의학회

Artificial Intelligence-Guided Mobile Telerehabilitation for Subjects with Cognitive Impairment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Artificial Intelligence-Guided Mobile Telerehabilitation for Subjects with Cognitive Impairment

Namo Jeon[1], Doo Young Kim[1], Taeksoo Jeong[1], Sue Been Kim[1], Bum-Suk Lee[1], Min-Soo Kang[2], Si-Woon Park[1],
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[2]Department of Physical and Rehabilitation Medicine, Seoseong Hospital, Incheon

Introduction

- To test feasibility and usability of Artificial Intelligence (AI)-guided mobile cognitive telerehabilitation program for patients with stroke or older adults with mild cognitive impairment

Method

- **Design:** Case series with pre-post comparison.
- **Setting:** A university hospital and a rehabilitation hospital
- **Participants:** Thirteen subjects with cognitive impairment (Mini-Mental State Examination (MMSE) ≤ 26): 9 subjects with stroke, 4 subjects with MCI.
- **Interventions:** Each participant was given a tablet PC on which AI-guided mobile cognitive rehabilitation program (Zenicog®) was installed, and instructed to go through total 24 sessions of 30-minutes training within 6 weeks.
- **Main Outcome Measures:** Cognitive assessments included MMSE, digit span, trail making test A & B. Usability questionnaire consisted of equitable and flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, size and space for approach and use, overall quality of product and overall satisfaction.

Results

Thirteen subjects with cognitive impairment were enrolled, including nine stroke patients in the subacute phase and four subjects with mild cognitive impairment (MCI). Two participants withdrew after enrollment due to lack of motivation; one from the MCI group before the initial assessment and the other from the stroke group after six sessions. Eleven participants completed all 24 sessions. The average age of the participants was 68.45 ± 8.61 years, with eight females (72.7%) and three males (27.3%). The average duration of education was 10.73 ± 3.26 years. The stroke participants had experienced their condition for an average of 79.63 ± 52.3 days post-onset. (Table 1)

Table 1. General Characteristics and Comparison between MCI and Stroke Groups

	Total (N=11)	MCI (N=2)	Stroke (N=9)
Age	68.45±8.61	77 ± 0	65.25±7.92
Sex , n (%)			
Female	8 (72.7%)	2 (100%)	5 (62.5%)
Male	3 (27.3%)	0 (0.0%)	4 (37.5%)
MMSE	22.64±3.93	26 ± 0.0	21.4 ± 3.9
Education duration (y)	10.73±3.26	13.33±2.31	9.75 ± 3.1
Onset to diagnosis (d)			79.63±52.3

Values, mean ± standard deviation; MCI, Mild Cognitive Impairment; MMSE, Mini-Mental State Examination.

The MMSE score was significantly increased from 22.64±3.93 at baseline to 26.18±3.22 after intervention (p=0.014). Other cognitive measures, such as digit span (forward and backward) and trail making test B, showed improvement after intervention without statistical significance. Health-related quality of life, self-efficacy and depression did not show significant change. (Table 2)

Table 2. Outcome measure analysis

		Pre-intervention	Post-intervention	p-value
MMSE	Total	22.64±3.93	26.18±3.22	0.014*
DSF	Total	4.3 [4.1, 5.05]	5 [4.25, 5.55]	0.180
DSB	Total	2.7±1.53	3.08±1.75	0.184
TMT-A	Total	33 [28.32, 71.33]	42.4 [26.5, 46.28]	0.477
TMT-B	Total	110 [64, 130]	77 [44.12, 107.26]	0.534
CESD	Total	6 [2.5, 18.5]	7 [4, 20.5]	0.964
EQ-5D-5L	Total	0.75 [0.42, 0.8]	0.8 [0.56, 0.84]	0.114
EQ-VAS	Total	60±25.69	61.82±29.60	0.771
SES	Total	26.82±7.81	26.27±8.36	0.781
SIADL				
Current Performance	MCI	1 [0.5, 1]	0 [0, 0]	0.157
Latent Capabilities	MCI	1 [0.5, 1]	0 [0, 0]	0.157
MBI	Stroke	58±25.30	71.13±22.13	0.124

*p<0.05, Values, mean ± standard deviation or median [1st quartile, 3rd quartile]; MCI, Mild Cognitive Impairment; MMSE, Mini-Mental State Examination; DSF, Digital Span Forward; DSB, Digital Span Backward; TMT-A, The Trail Making Test-A;TMT-B, The Trail Making Test-B; CESD, Center for Epidemiological Studies-Depression Scale; EQ-5D-5L, 5-level-EuroQol Group-5D; EQ-VAS, EuroQol Group visual analog scale; SES, Self-efficacy scale; SIADL, Seoul Instrumental Activities of Daily Living; MBI, Modified Barthel Index

The overall quality of product and the overall satisfaction in the usability questionnaire scored 4.00±0.87 and 3.94±1.18, respectively. The domain that showed lowest score was tolerance for error (3.14±1.1). Female participants gave lower score in tolerance for error than male participants, and the participants with less than 12 years of education gave lower score in equity and flexibility in use than those with 12 or more years of education. (Table 3)

Table 3. Results of the Usability Questionnaire (Scaled to 5 Points)

	mean±SD	Male (n=3)	Female (n=8)	Education <12 (n=5)	Education ≥12 (n=5)
Equity and Flexibility	4±1.02	4.44±0.96	3.83±1.05	4.67±0.67	3.2±0.77*
Simplicity and Intuitive Use	3.86±0.98	4.33±0.58	3.69±1.07	4.17±1.17	3.5±0.61
Information Clarity	3.95±0.72	4.17±0.76	3.88±0.74	4.08±0.8	3.8±0.67
Tolerance for error	3.14±1.1	4.25±0.9	2.72±0.87*	3.42±1.42	2.8±0.48
Minimization of Physical Effort	4.32±0.96	4.67±0.58	4.19±1.07	4.67±0.52	3.9±1.24
Size and Space for Use	4.23±0.68	4.5±0.87	4.13±0.64	4.58±0.66	3.8±0.45
Product Evaluation	4±0.87	4.6±0.69	3.78±0.86	4.37±0.9	3.56±0.67
Product Satisfaction	3.94±1.18	4.56±0.77	3.71±1.27	4.17±1.49	3.67±0.75
The overall quality of the product	4.00 ± 0.87				

*p<0.05, Values, mean ± standard deviation;

Conclusion

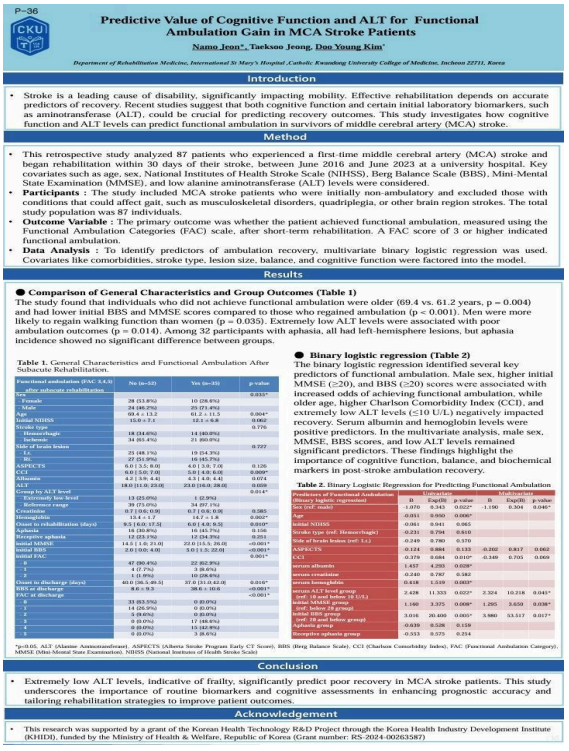
- AI-guided mobile cognitive telerehabilitation program is feasible and potentially beneficial in improving cognitive function for patients with stoke or older adults with MCI. Special consideration should be given to those who are less familiar with electronic devices to improve its usability.

Acknowledgement

- This research was supported by a grant of the Korean Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry of Health & Welfare, Republic of Korea (Grant number: RS-2024-00263587)

2024 추계 대한재활의학회

Predictive Value of Cognitive Function and ALT for Functional Ambulation Gain in MCA Stroke Patients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Predictive Value of Cognitive Function and ALT for Functional Ambulation Gain in MCA Stroke Patients

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Introduction

- Stroke is a leading cause of disability, significantly impacting mobility. Effective rehabilitation depends on accurate predictors of recovery. Recent studies suggest that both cognitive function and certain initial laboratory biomarkers, such as aminotransferase (ALT), could be crucial for predicting recovery outcomes. This study investigates how cognitive function and ALT levels can predict functional ambulation in survivors of middle cerebral artery (MCA) stroke.

Method

- This retrospective study analyzed 87 patients who experienced a first-time middle cerebral artery (MCA) stroke and began rehabilitation within 30 days of their stroke, between June 2016 and June 2023 at a university hospital. Key covariates such as age, sex, National Institutes of Health Stroke Scale (NIHSS), Berg Balance Scale (BBS), Mini-Mental State Examination (MMSE), and low alanine aminotransferase (ALT) levels were considered.
- **Participants :** The study included MCA stroke patients who were initially non-ambulatory and excluded those with conditions that could affect gait, such as musculoskeletal disorders, quadriplegia, or other brain region strokes. The total study population was 87 individuals.
- **Outcome Variable :** The primary outcome was whether the patient achieved functional ambulation, measured using the Functional Ambulation Categories (FAC) scale, after short-term rehabilitation. A FAC score of 3 or higher indicated functional ambulation.
- **Data Analysis :** To identify predictors of ambulation recovery, multivariate binary logistic regression was used. Covariates like comorbidities, stroke type, lesion size, balance, and cognitive function were factored into the model.

Results

● **Comparison of General Characteristics and Group Outcomes (Table 1)**
The study found that individuals who did not achieve functional ambulation were older (69.4 vs. 61.2 years, p = 0.004) and had lower initial BBS and MMSE scores compared to those who regained ambulation (p < 0.001). Men were more likely to regain walking function than women (p = 0.035). Extremely low ALT levels were associated with poor ambulation outcomes (p = 0.014). Among 32 participants with aphasia, all had left-hemisphere lesions, but aphasia incidence showed no significant difference between groups.

Table 1. General Characteristics and Functional Ambulation After Subacute Rehabilitation.

Functional ambulation (FAC 3,4,5) after subacute rehabilitation	No (n=52)	Yes (n=35)	p-value
Sex			0.035*
Female	28 (53.8%)	10 (28.6%)	
Male	24 (46.2%)	25 (71.4%)	
Age	69.4 ± 13.2	61.2 ± 11.5	0.004*
Initial NIHSS	15.0 ± 7.1	12.1 ± 6.8	0.062
Stroke type			0.776
Hemorrhagic	18 (34.6%)	14 (40.0%)	
Ischemic	34 (65.4%)	21 (60.0%)	
Side of brain lesion			0.777
Rt.	25 (48.1%)	19 (54.3%)	
Lt.	27 (51.9%)	16 (45.7%)	
ASPECTS	6.0 [3.5, 8.0]	4.0 [3.0, 7.0]	0.126
CCI	6.0 [5.0, 7.0]	5.0 [4.0, 6.0]	0.009*
Albumin	4.2 [3.9, 4.4]	4.3 [4.0, 4.4]	0.074
ALT	18.0 [11.0, 23.0]	23.0 [16.0, 28.0]	0.010*
Group by ALT level			0.014*
Extremely low level	13 (25.0%)	1 (2.9%)	
Reference range	39 (75.0%)	34 (97.1%)	
Creatinine	0.7 [0.6, 0.9]	0.7 [0.5, 0.9]	0.585
Hemoglobin	13.4 ± 1.8	14.7 ± 1.8	0.005*
Onset to rehabilitation (days)	8.5 [8.0, 17.3]	8.0 [4.0, 9.5]	0.010*
Dysphagia	18 (30.8%)	16 (45.7%)	0.158
Receptive aphasia	14 (23.7%)	12 (34.3%)	0.324
Initial MMSE	14.0 [1.0, 21.0]	22.0 [15.5, 26.0]	<0.001*
Initial BBS	2.0 [0.0, 6.0]	5.0 [1.5, 22.0]	<0.001*
Initial FAC			0.001*
0	47 (90.4%)	22 (62.9%)	
1	4 (7.7%)	3 (8.6%)	
2	1 (1.9%)	10 (28.6%)	
Onset to discharge (days)	40.0 [26.5, 49.5]	37.0 [31.0, 42.0]	0.016*
BBS at discharge	8.0 ± 9.3	38.0 ± 10.0	<0.001*
FAC at discharge			<0.001*
0	33 (63.5%)	0 (0.0%)	
1	14 (26.9%)	0 (0.0%)	
2	3 (5.8%)	0 (0.0%)	
3	0 (0.0%)	17 (48.6%)	
4	0 (0.0%)	15 (42.9%)	
5	0 (0.0%)	3 (8.6%)	

● **Binary logistic regression (Table 2)**
The binary logistic regression identified several key predictors of functional ambulation. Male sex, higher initial MMSE (≥20), and BBS (≥20) scores were associated with increased odds of achieving functional ambulation, while older age, higher Charlson Comorbidity Index (CCI), and extremely low ALT levels (≤10 U/L) negatively impacted recovery. Serum albumin and hemoglobin levels were positive predictors. In the multivariate analysis, male sex, MMSE, BBS scores, and low ALT levels remained significant predictors. These findings highlight the importance of cognitive function, balance, and biochemical markers in post-stroke ambulation recovery.

Table 2. Binary Logistic Regression for Predicting Functional Ambulation

Predictors of Functional Ambulation (Binary logistic regression)	Univariate			Multivariate		
	B	Exp(B)	p-value	B	Exp(B)	p-value
Sex (ref: male)	-1.070	0.343	0.022*	-1.190	0.304	0.046*
Age	-0.051	0.950	0.006*			
Initial NIHSS	-0.061	0.941	0.065			
Stroke type (ref: Hemorrhagic)	-0.231	0.794	0.610			
Side of brain lesion (ref: Lt.)	-0.249	0.780	0.570			
ASPECTS	-0.124	0.884	0.133	-0.202	0.817	0.062
CCI	-0.379	0.684	0.010*	-0.349	0.705	0.069
serum albumin	1.457	4.293	0.028*			
serum creatinine	-0.240	0.787	0.182			
serum hemoglobin	0.418	1.519	0.003*			
serum ALT level group (ref: 10 and below 10 U/L)	2.428	11.333	0.022*	2.324	10.218	0.045*
initial MMSE group (ref: below 19 group)	1.160	3.325	0.008*	1.295	3.650	0.038*
initial BBS group (ref: 20 and below group)	3.016	20.400	0.005*	3.980	53.517	0.017*
Aphasia group	0.038	0.236	0.158			
Receptive aphasia group	-0.533	0.573	0.254			

*p<0.05, ALT (Alanine Aminotransferase), ASPECTS (Alberta Stroke Program Early CT Score), BBS (Berg Balance Scale), CCI (Charlson Comorbidity Index), FAC (Functional Ambulation Category), MMSE (Mini-Mental State Examination), NIHSS (National Institutes of Health Stroke Scale)

Conclusion

- Extremely low ALT levels, indicative of frailty, significantly predict poor recovery in MCA stroke patients. This study underscores the importance of routine biomarkers and cognitive assessments in enhancing prognostic accuracy and tailoring rehabilitation strategies to improve patient outcomes.

Acknowledgement

- This research was supported by a grant of the Korean Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry of Health & Welfare, Republic of Korea (Grant number: RS-2024-00263587)

CORE COMPETENCIES

임상연구 전문 역량

다기관 임상시험 운영	**IRB · CRIS** 관리	대상자 모집·관리	연구비 집행·관리
데이터 관리	임상시험 문서 관리	학술 논문 작성	학회 발표

AI & 디지털 헬스케어

AI 툴 활용 ChatGPT · Claude 등	디지털 치료제 임상연구 경험	디자인·협업 도구 Figma · Workspace	문헌 분석 AI 기반 리서치