Therapists' Perceptions on the Use of Artificial Intelligence & Machine Learning in Post-Stroke Rehabilitation: Insights, Potential Applications, & Barriers

Dr. Kasey Stepansky, CScD, OTR/L, C/NDT, CBIS[1]
Dr. Elena Donoso Brown, PhD, OTR/L[1]
Dr. Min Lee, PhD[2]
Hannah Clark, OTD[1]
Kaia Mikula, MS, OT[1]
Mia DelVecchio, BA[3]
Robert Halyama, BS, HS[1]

[1]Duquesne University, [2]Singapore Management University, [3]Notre Dame University
No financial disclosures.

SMU
SINGAPORE MANAGEMENT UNIVERSITY

DUQUESNE UNIVERSITY
John G. Rangos, Sr. School of Health Sciences

Background

2/3 persons post-stroke require rehabilitation	• In 2023, 11.71 million people have had a stroke world-wide.[1, 2]
Artificial Intelligence (AI) / Machine Learning (ML)	• Emerged as a potential approach in assessment, documentation, and promotion of home program adherence in stroke rehabilitation.[3]
Technology use is **low** and **infrequent**	• Due to complex patient symptomatology, ease of use, and therapist training for utilization in stroke rehabilitation.[4-6]

Purpose

Explore rehabilitation therapists' perceptions of AI/ML technologies in individuals in post-stroke assessment and intervention.

Methods

Design

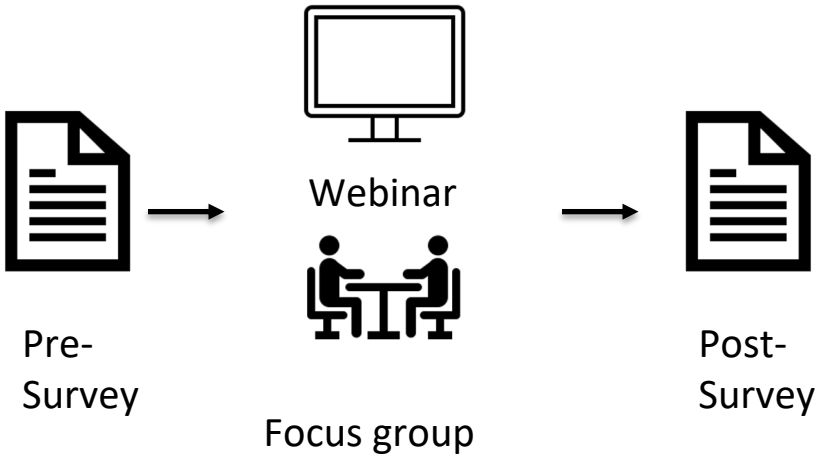
- Embedded mixed method design

Inclusion Criteria

- Licensed PT or OT in the United States or Asia
- Speak English
- 30% of caseload with persons' post-stroke

Methods

Data Collection



Data Analysis

Qualitative

- Content analysis
- Consensual coding with triangulation by analyst

Quantitative

- Descriptive statistics including means & frequencies
- Rank order questions weighted and summed

Results

Demographics (n=29)

- Male: 10, Female: 19
- Professions
  - Occupational Therapist: 18
  - Physical Therapist: 10
  - Did Not Specify: 1
- 52% of participants were 25-34 years old
- US: 26, Asia: 3

Key Themes

- Current Practice & Identified Gaps
- Current Therapist Perceptions of AI/ML
- Perceived Future of AI/ML
- Steps Needed for Implementation

1. Current Practice & Identified Gaps

Current Technology

69% (n=20) of therapists report **never** using activity trackers or gait analysis technology in practice.

Current Evaluation Process

"the 9 hole peg test, test the box and blocks, the grip strength, the dynamometer, […]" (FG2, P3)

Limitations in Current Practice

"I can test all the individual systems, but trying to get a big picture view of what the functional movement looks like […]" (FG2, P2)

“There’s nothing that we could use to show progress other than that. So we’re kind of stuck with what we have on our assessment toolbox or what we see.” (FG1, P3)

2. Current Therapist Perceptions of AI/ML

Prior AI/ML Knowledge

"I think I was kind of in my mind classifying AI as more of only machine learning." (FG2, P2)

“…my understanding is that [AI/ML], it’s whatever information that you put into it, that’s what it utilizes.” (FG3, P3)

Personal Attitudes

(52%, n= 15) of therapists agreed or strongly agreed that AI could support assessment and (62% n=18) for intervention

"[..] I don't think you can replace therapists, like the skill and experience level and just hands-on handling patients compared to a computer." (FG6, P1)

2. Current Therapist Perceptions of AI

Perceived Patient Attitudes

"They're not really into like the technology of things like even video games, or maybe like activities on a computer, […], so, they're a little more resistant to any of that" (FG6, P1)

“I think there’s also a level of trust that the patients were very anxious, you know at least right at the get-go, because this machine is forcing them to move a specific way, you know they didn’t feel like they had as much control over their bodies, etc.” (FG4, P2)

3. Perceived Future

Practical Applications

"[…] AI could read the patient's progress and then maybe develop an exercise program that's more challenging for them" (FG3, P1)

Difficulties using AI

"The learning curve is definitely going to be steep for someone who is not familiar with AI or computers or anything like that." (FG1, P1)

Uncertainty related to AI

"I don't know if we can, just came right to mind is, how can you do that? Like an AI based assessment or treatment plan for fall prevention […]" (FG1, P2)

4. What is Necessary for Implementation

New Knowledge

"I never put smartphone as an artificial intelligence. I didn't think about that." (FG4, P1)

Approachability to Technology

“Right, it’s simple for the client to use. Can’t be too complicated." (FG4, P1)

4. What is Necessary for Implementation

AI Educational Tools

"I guess show them from the video introduce them to AI models and demonstrate for them is a good way." (FG5, P1)

Post webinar survey results indicated that the most influential components of the webinar/focus group were description of AI/ML, examples of AI/ML, and discussion of pros and cons.

Discussion

- There is a lack of frequent technology use from therapists however they are aware of different technologies
- Prioritization to support implementation of AI/ML into clinical practice:
  - ease of use
  - evidence of effectiveness
  - educational/training needs
- Ensure that AI/ML development does not exceed the practicalities of clinical utility

Questions?

Dr. Kasey Stepansky
Stepanskyk@duq.edu

Dr. Elena Donoso Brown
donosobrowne@duq.edu

References

[1]Feigin, V. L., Brainin, M., Norrving, B., O Martins, S., Pandian, J.. Lindsay, P., Grupper, M. F., & Rautalin, I. (2025). World Stroke Organization: Global stroke fact sheet 2025. *International Journal of Stroke, 20*(2), 132-144. https://doi.org/10.1177/17474930241308142.

[2]Ju, Y. W., Lee, J. S., Choi, Y., & Kim, Y. H. (2022). Causes and trends of disabilities in community-dwelling stroke survivors: A population-based study. *Brain Neurorehabilitation, 15*(1), 1-10. https://doi.org/10.12786/bn.2022.15.e5

[3]Luvizutto, G. J., Silva, G. F., Nascimento, M. R., Sousa Santos, K. C., Appelt, P. A., de Moura Neto, E., de Souza, J. T., Wincker, F. C., Miranda, L. A., Filho, P. T. H., Sande de Souza, L. A. P., Simões, R. P., de Oliveria Vidal, E. I. & Bazan, R. (2021). Use of artificial intelligence as an instrument of evaluation after stroke: A scoping review based on international classification of functioning, disability and health concept: AI applications for stroke evaluation. *Topics in Stroke Rehabilitation*, *29*(5), 331–346. https://doi.org/10.1080/10749357.2021.1926149

[4]Chen, C. C., & Bode, R. K. (2011). Factors influencing therapists' decision-making in the acceptance of new technology devices in stroke rehabilitation. *American Journal of Physical Medicine & Rehabilitation*, *90*(5), 415–425. https://doi.org/10.1097/PHM.0b013e318214f5d8.

[5]Simpson, L. A., Menon, C., Hodgson, A. J., Mortenson, W. B., & Eng, J. J. (2021). Clinicians' perceptions of a potential wearable device for capturing upper limb activity post-stroke: A qualitative focus group study. *Journal of Neuroengineering and Rehabilitation*, *18*(135), 1-10. https://doi.org/10.1186/s12984-021-00927-y.

[6]Bower, K. J., Verdonck, M., Hamilton, A., Williams, G., Tan, D., & Clark, R. A. (2021). What factors influence clinicians' use of technology in neurorehabilitation? A multisite qualitative study. *Physical Therapy*, *101*(5), 1-9. https://doi.org/10.1093/ptj/pzab031