Developing a Telehealth Home-based Exercise Program to Support Exercise Guidelines Adherence for Persons with Spinal Cord Injury (SCI)

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Background

- One in four persons with SCI struggle to meet the physical fitness level, which leads to health complications (e.g., diabetes, obesity, & cardiovascular disease). Regular exercise can mitigate these complications.

- International organizations have established exercise guidelines for persons with SCI, but most of them have reported minimal physical exercise.

- The low adherence to the recommended threshold can be attributed by barriers, including environmental factors like cost, facility accessibility, transportation, and personal challenges like low motivation.

PHYSICAL ACTIVITY GUIDELINES for Adults with Spinal Cord Injury

STARTING LEVEL
AEROBIC ACTIVITY
20 MINUTES 2x A WEEK
of moderate to vigorous intensity
AND
STRENGTH-TRAINING ACTIVITY
3 SETS 10 REPS 2x A WEEK
for each major muscle group

ADVANCED LEVEL
AEROBIC ACTIVITY
30 MINUTES 3x A WEEK
of moderate to vigorous intensity
AND
STRENGTH-TRAINING ACTIVITY
3 SETS 10 REPS 2x A WEEK
for each major muscle group

START — MEET — EXCEED

Significance

- Exercise programs using the mobile app tailored to individual needs present a promising solution for promoting exercise adherence.

- **Aim:** To identify factors affecting the successful implementation of an app-based home exercise program, and gather feedback on app preferences, functionality, & features.

Procedures & Evaluation Plan

Overview of App Development

1. Expert Panel
2. Focus Group
3. App Modification
4. Usability Testing
5. App Modification
6. SMART

Evaluation Framework and Procedures

- This project focuses on steps 1-3. Guided by the Consolidated Framework for Implementation Research (CFIR), 26 clinicians completed an expert panel survey to rank factors influencing the implementation of an app-based intervention for increasing exercise adherence for persons with SCI.

- CFIR-selected factors and app quality features obtained from the Mobile Application Rating Scale (MARS) framework were discussed in 7 focus groups with 23 persons with SCI, 6 caregivers, and 6 clinicians.

Data Analysis

- We used descriptive statistics to analyze the expert panel survey & a directed content analysis to analyze focus group transcripts.

App Modification

Main Themes	Subject Quotes	Recommended Features	Decision Matrix	Final Features
• Usability • Instructions and guidelines • Clinician interaction • Tracking progress/workout • Filters • Accessibility • Equipment	*"Videos are just easier, and you can always go back and kind of correct yourself and just visually seeing it. It helps"* *"The other thing I thought is that you actually have paraplegics do the exercise"*	• Allow users to see their previous surveys • Allow users to review past exercise notes • Allow user to save progress for an exercise • Allow users to snooze notifications • Add chat room for users	• Feature prioritization and feasibility analysis • Collaborate with the technology vendor	• Past notes from past exercises • Save partial progress • Send users a follow up reminder for incomplete daily program

Results

Key Themes Emerging from Focus Groups

High-level Theme	Mid-level Theme	Low-level Theme	SCI (%)	CG (%)	Clin (%)
General App Feature	Usability		13.0	0.9 / 14.2	0.8
	Integration (w/ Other apps)		4.5	4.4	0.8
	User-Friendly Interface		4.9	6.8	0.8
	Workout/exercise Design		1.0	0.9	0.8
		Instruction or guidelines	8.8	10.6	2.4
		Equipment	1.0		0.8
		Time commitment	0.3	1.8	10.5
		Filters	0.6		1.6
	Cost		0.3		
Customized/Personalized Training Program	Goal/Plan Setting		3.9	5.3	0.8
	Representation		1.6	1.8	0.8
	Accessibility		2.9	0.9	11.5
			1.3		0.8
	Variety in Exercise Proposals	Exercise modifications	2.9		0.8
		Time/schedule modifications	5.5	3.5	3.2
		Moderate-intensity Activities			0.8
Performance Tracking and Feedback	Progress Assessment and Self-Reflection	Summary	0.3		2.4
		Tracking Progress/workout	0.3		1.6
			3.8	5.3	
		Perceived Benefits and Achievement	1.6		
	Tracking Health Measurements		2.3	2.7	0.8
	User Feedback	EMA surveys	3.9	4.4	1.6
		Reporting	1.3		1.6
Gamification/Entertainment	Rewards and Incentive		1.3		
	Challenges and Competitions		4.5	4.4	1.6
	Encouraging Pop-ups		3.2	3.5	2.4
	Music		0.6	0.9	
	Virtual Human guide		1.0	2.7	0.8
In-App Educational Content	Health and Nutrition Tips		1.3		8.1
Reminder and Notification System			0.3	3.5	0.8
			4.9	2.7	
Community and Professional support	Social Community		2.3	2.7	0.8
		Sharing	1.0		
			2.3	2.7	
	Clinician Interaction		8.2	5.3	1.6
	Executing Time		0.3	5.3	3.2

Key Features of Mobile Exercise App

Activities | **Instruction** | **Goals** | **Survey**
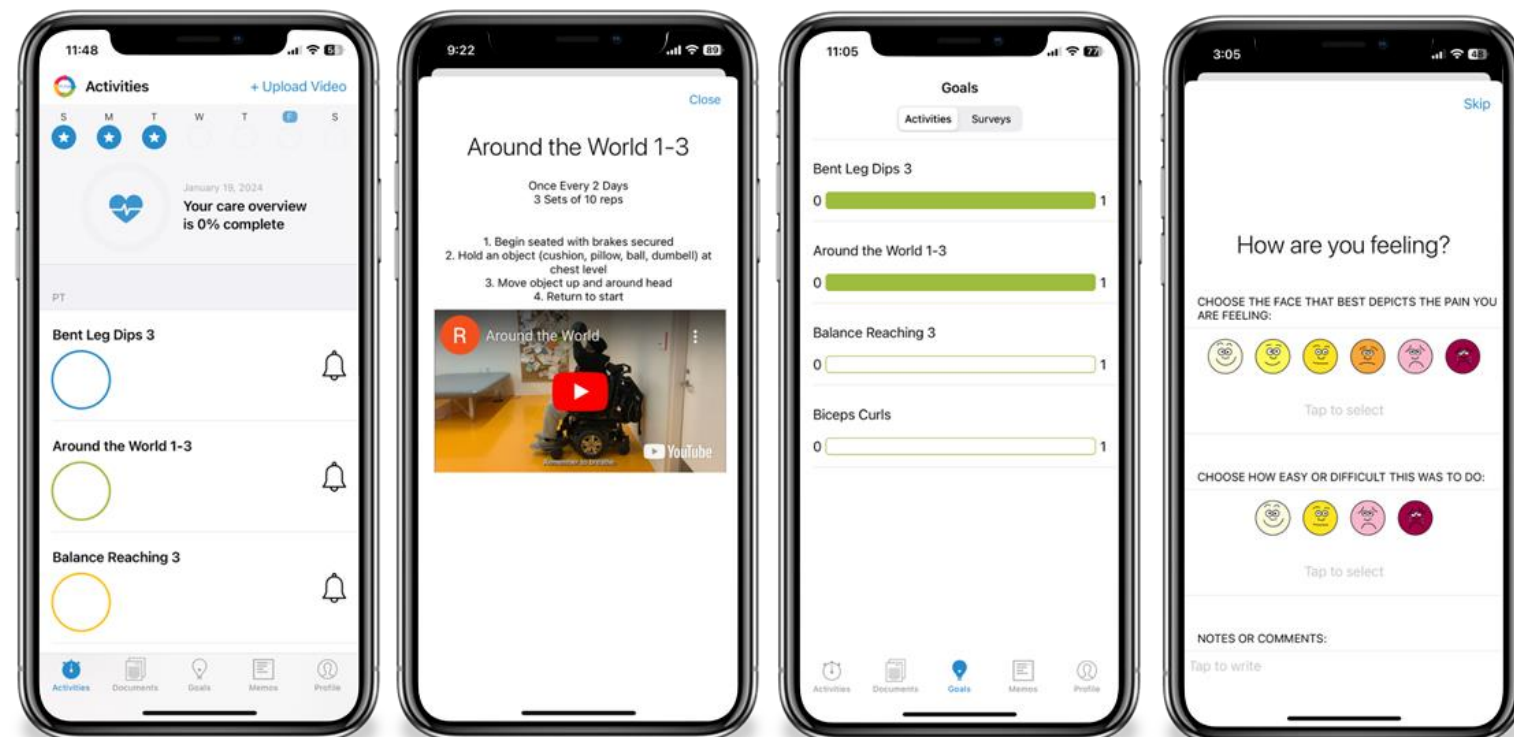
- Funding: NIDILRR (Grant no. 90SIMS0015)
- Download our paper - *Disability & Health Journal* (PMID: 38964938)

Discussion & Conclusion

- Key CFIR factors that affected the intervention's success: adaptability, complexity, evidence strength/quality, relative advantage, knowledge about the initiative, & execution

- Major themes from focus groups with persons with SCI & caregivers included: usability, instructions, user-friendly interface, & clinician interaction. Clinicians mentioned themes included: the SCI representation, time commitment, accessibility, & equipment.

- Our results highlight the significance of incorporating these determinants into future designs, and resonate with the need for inclusivity and user-centered design in tailoring health and fitness applications for persons with SCI.