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Designing & Implementing Robotic Animal Interventions for Adults with Dementia

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DEVELOPING & IMPLEMENTING ROBOTIC PET INTERVENTIONS FOR ADULTS WITH DEMENTIA

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BACKGROUND

Dementia is a neurodegenerative condition characterized by physical and cognitive decline, and a major cause of disability and dependency worldwide[9]. **Behavioral & Psychological Symptoms of Dementia (BPSD)** include agitation, depression, apathy, wandering and terminal restlessness. **Robotic Pet Intervention (RPI)** is a relatively new treatment which incorporates interactive robotic animals into therapeutic activities. Features include sound, light and touch sensors, on/off/mute settings, and realistic fur. Documented benefits for dementia care include improvements in BPSD, reduced loneliness[7], improved social interaction[2,7,8], and reduced need for pain medication[3]. Although promising, the potential impacts of RPI on adults with dementia are not fully understood.

Five Joy for All™ robotic cats were used for this capstone project

RESEARCH QUESTION & CAPSTONE AIMS

Question: How does RPI affect occupational performance outcomes among adults with dementia living in long-term care facilities?

Aims: Design and implement effective OT-based RPI for adults with dementia living in a long-term care facility, while developing and distributing relevant educational materials for key stakeholder use after project completion.

METHODS

Primary participants included 40 full-time memory care residents at Steere House Nursing & Rehabilitation Center in Providence, RI. **Key stakeholders** included care teams involved in memory care (Nursing, Activities and Rehabilitation) and family members who expressed interest in the project

Cognitive assessments were conducted with all residents to establish cognitive baseline and determine if RPI benefitted individuals at specific levels. Assessments included the Allen Diagnostic Module-2nd Ed. (ADM-2) placemat test, Low Cognitive Level Assessment, and QCS Pool Activity Level (PAL) Instrument.

ADM-2 placemat assessment:
(Left) Example pattern, (right & center) results from residents

RPI was provided for residents, in individual and group sessions, over a period of two months. Any changes as a result of RPI were noted through direct observation, informal interviews, conversations, and care staff reports via on-site Minimum Data Set (MDS) and Electronic Medical Record (EMR)

Education about RPI was presented to families via Zoom. A resource binder detailing cognitive levels, RPI, appropriate activities and sensory strategies was presented via in-service to all three care teams. In-person demonstration was provided for Activities staff.

COGNITIVE COLORS

A four-color cognitive category system, based on the QCS Pool Activity Level (PAL) Instrument of Occupational Profiling, was developed and presented to care staff for future use.

GREEN (14 Residents)
• High middle to high early-stage dementia
• Attention span: Thirty minutes to several hours
• Can follow two to three-step activities

PURPLE (3 Residents)
• Mild cognitive impairment
• Attention span: Several hours
• Responds best to short, simple sentences, choice and control

RED (5 Residents)
• Late to end-stage dementia
• Attention span: seconds, five minutes at most
• Responds best to direct sensory stimulation

BLUE (18 Residents)
• Low middle to late-stage dementia
• Attention span: Several minutes, up to half an hour
• Responds best to demonstration and multi-sensory experiences

RPI SESSIONS

The robotic cats elicited a calming, nurturing response among residents and provided opportunities to socialize, engage in meaningful occupations and improve safety. Residents at low to mid-cognitive levels responded best to sensory input provided by the animals for shorter time periods (up to 15 minutes). Mid to high-cognitive level residents engaged in more conversation for longer periods (30-45 minutes). The cats were not always effective for extremely agitated residents, at best providing only a temporary distraction. Care staff education was provided for best practices in these situations.

Confabulation was noted among Green and Purple residents, who often believed the cats were real. Green and Purple residents were more verbal, talked and responded to the cats, and reminisced about pets from their past. Green and Blue residents narrated the cat's actions and imitated the sounds. Lower-level Blue and Red residents were less verbal and preferred to hold and pet the cats in their lap.
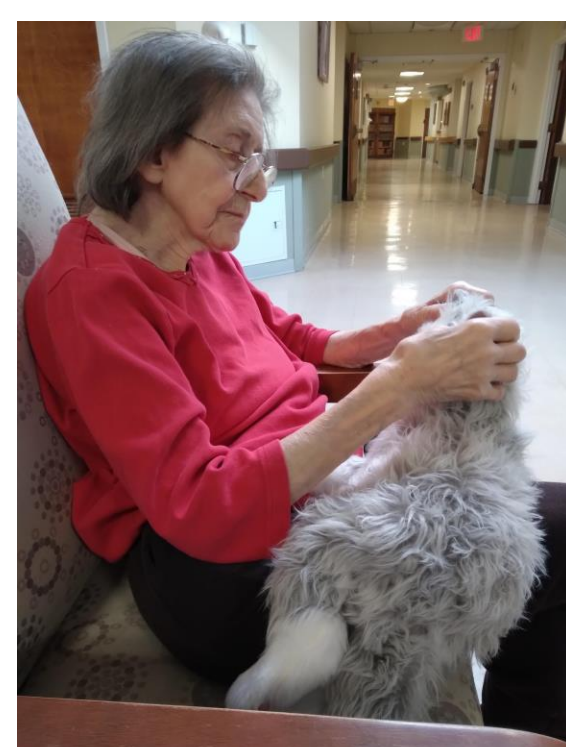
Adoption Day   **Spa Day** (before and after)   **Walker Safety** (before and after)

RPI – RESPONSE FROM RESIDENTS

POSITIVE

VERBAL
"You're beautiful!"
"What's wrong? What do you need?"
"He's a nice one. His sister is over there."
"He's going 'meow meow.'"

NONVERBAL
Smiling
Reaching for the cat
Petting and holding the cat

NEGATIVE

VERBAL
"Look at that stupid cat"
"Is he growling at me? Will he bite me?"
"Where's the owner? No one's feeding him. He's hungry. Take him home."

NONVERBAL
Yelling
Pushing the cat away

RESULTS – CARE STAFF EDUCATION

All three care teams expressed appreciation for the resource binder, which they found to be helpful and enjoyable. **Nursing** and **Activities** reported the cognitive colors were easy to understand and increased their knowledge of different cognitive levels, appropriate activities, sensory strategies and communication styles. **Rehabilitation** staff reported they would continue to utilize the cognitive colors to assess future memory care residents, and believed this would improve interdisciplinary care across the unit.

CONCLUSION

This capstone provides improved understanding of the effects of RPI on occupational outcomes among adults living with dementia, and impacts and best practices of RPI for different cognitive levels. Overall, the robotic animals noticeably improved mood, social participation, occupational engagement and safety.

This capstone also improved care staff understanding of different cognitive levels and improved confidence in planning and implementing appropriate activities, including RPI and sensory strategies, for memory care residents.

Finally, this capstone demonstrates how collaboration between OT and memory care teams can positively impact quality of life among this population.

IMPACT FOR OT

Given the prevalence and expected increase of dementia diagnoses worldwide, there is an urgent need for occupational therapists to work with this population.

Robotic animals are a unique and promising intervention occupational therapists can use to increase engagement in meaningful daily activities.

Given the significant challenges faced by this population, occupational therapists should collaborate with healthcare, families and other professionals to support the use of RPI to facilitate participation in meaningful occupations.

Occupational therapists can play an important role in educating other healthcare professionals about the importance of occupational engagement, different cognitive levels and appropriate activities for people living with dementia.

There are research opportunities, using longer-term, rigorous study design and standardized methods, to produce definitive conclusions on the effectiveness of OT-based RPI among this population.

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