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Animal Assisted Interactions with an Animal Robot During Physical and Occupational Therapy Sessions in the Pediatric ICU: A Feasibility Study

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Introduction

The highly technical, fast-paced intensive care unit (ICU) environment and the severely immunocompromised health statuses of ICU patients greatly limits the exploration of animal assisted interactions (AAI) in the ICU. A new frontier in animal robotics opens a vast array of opportunities to implement AAI in the critically-ill population.

Purpose

Establish the feasibility and acceptability of PARO™ for patients admitted to the ICU and examine the therapeutic effect of PARO™ on patient physiological variables.

Theoretical Framework

This study is guided by the P.A.C.E. (practitioner, animal, client, and environment) Model, which establishes a framework to assess the goals, precautions and objectives of each AAI session.

Methods

Design: Single-arm, quasi-experimental, pretest-posttest exploratory study
Sample: 30 critically-ill pediatric patients are currently being recruited from a single PICU in Omaha, NE
Intervention: PARO™ is an advanced interactive, therapeutic medical robot that can perceive people and its environment in real time. The physical therapist (PT) and/or occupational therapist (OT) is responsible for directing the therapy session with PARO™ . The following skills are targeted at the PT/OT’s discretion: speech, memory, fine motor skills, balance and endurance, self-esteem, and sensory stimulation.

Measures:

- Patient Demographics
- Pre/post Session Variables: Vital signs, Pain (Wong-Baker FACES Pain Scale), Anxiety (Children’s Anxiety Meter-State [CAM-S])
- Therapy Session Activities (Activity Performance Form)
- Intervention Acceptability (Post Study Interview)

Procedures: Vital signs, anxiety, and pain are assessed 5 minutes prior/5 minutes after each session. Field notes are taken by research staff during the session. Subjects remain in the study for up to 7 sessions or until they are discharged from the PICU. A qualitative interview is conducted upon study completion.

Robot animals can and should be used to promote patient physical and psychological wellbeing during rehabilitative care in the pediatric ICU



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Preliminary Results (N=10)

Demographics

Age in years	Range: 5-17 M (SD) = 11.1 (4.1)
Gender	8 male 2 female
Race/Ethnicity	5 Caucasian 3 African American 2 Hispanic
Pediatric Risk of Mortality at Time of Study Enrollment PRISM III Range (0 to ≥20)	M (SD) = 10.2 (8.9)

Therapy Session Activity Details

10 subjects have undergone (n=26) distinct therapy sessions Session Length in Minutes: M=33.2; SD=7.7 Number of Sessions per Subject: M=2.6; SD=1.3			
Speech (n=25)		Balance and Endurance (n=26)	
Calling Paro’s name	No. (%) 20 (80)	Reaching to Paro from Left to Right	No. (%) 15 (58)
Clapping hands to get Paro’s attention	6 (24)	Moving Paro from one surface to another	19 (76)
Using voice to talk to Paro	17 (68)	Pushing Paro while Paro is in a cart	7 (27)
Telling Paro Stories	15 (60)	Walking while holding Paro	3 (12)
Memory (n=23)		Self-Esteem (n=26)	
Remember Paro’s name, species	No. (%) 22 (96)	Paro’s total acceptance of disability and/or appearance	No. (%) 24 (92)
		Empowerment in getting a response to movement or voice	25 (96)
Participating in activities with a Paro picture book	4 (17)	Increased social interaction with others because of Paro	22 (85)
Fine Motor (n=25)		Sensory Stimulation (n=19)	
Petting, Brushing, Feeding	No. (%) 24 (96)	Feeling fur and body warmth	No. (%) 19 (100)
Dressing, Undressing	12 (48)	Feeling flippers, tail, nose, feet, nails, ears, etc	11 (58)
Cleaning	4 (16)	Hearing barking and other vocalizations	11 (50)

Post Study Interview Responses

Question	Subject Responses
What did you like most about the seal?	• It was different form the normal • It made me feel calm • It moved
What activity did you like doing most with the seal?	• Fishing • Dancing • Decorating it • Walking walk holding it • Touching and petting it
Was the seal fun?	• Yes, it made me distracted at took the pain away • Yes, it was different • Yes, it was fun to have a pet • Of course because it helped me calm down and was so cuddly and cute • Yes, it made getting up fun • I liked that it made sounds and turned its head

Conclusions

This novel intervention has great potential to positively impact the psychophysiological outcomes of critically ill patients and transform ICU rehabilitation practices.

Preliminary study results indicate that PARO is feasible and acceptable to use in the PICU and AAI using robot animals will elicit similar positive effects as AAI with live animals.

There are plans to expand study to a second clinical site. Additional behavioral measures related to patient motivation and guardian satisfaction will be added. Physiologic surveillance will be enhanced by monitoring patient galvanic skin response and heartrate variability during each session.

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