Effects of a Robotic Cat on Agitation and Quality of Life in Individuals with Dementia in a Long Term Care Facility


BACKGROUND
As of 2017, 47.5 million people are diagnosed with dementia, and this number is expected to nearly triple by 2050.1 This disorder is progressive and manifests in behavioral and psychological problems, influencing quality of life and increasing the burden of care.2 Due to the high level of burden placed on caregivers, many individuals with dementia reside in long term care facilities. Over the course of the illness, there is a tendency towards decreased participation in activities and inability to complete basic activities of daily living.3 Health care providers need to be aware of these effects and advocate for pharmacological and nonpharmacological treatment plans to improve their patient’s well-being.

Animal assisted therapy is known to be effective in mediating the behavioral problems associated with this disease, however live animals carry risks and responsibilities.4 Therapeutic robots provide a promising alternative to traditional pet therapy and have been shown to have similar benefits.5

PURPOSE
- To determine whether a robotic companion animal may improve affect and increase participation or performance for residents with dementia.
- To determine potential benefits for caregiver roles and relationships with individuals with dementia.

RESEARCH QUESTIONS
- Do symptoms of agitation decrease in the presence of a robotic companion cat?
- Is there a change in heart rate or oxygen saturation with the use of a robotic companion cat?
- Do caregivers perceive that a robotic companion cat mediates the effects of agitation and anxiety in individuals with dementia?
- Is the need for psychotropic or pain medication impacted by the use of a robotic companion cat?

METHODS
STUDY DESIGN AND SUBJECTS
Research was conducted at Bridgewater Retirement Community, in complete-care nursing households. We recruited 11 participants, aged 81-95 years old and all data was collected within each resident’s household and common area. All participants had a diagnosis of dementia, resided in a long term care facility, and relied on the assistance from caregivers for some or all activities of daily living.

DATA COLLECTION
Data was continuously collected over the course of 6 weeks by staff, along with visits twice weekly by the researchers, and was collected using a mixed-methods design. Quantitative measures included佩 and post Cohen-Mansfield Agitation Inventory (CMAI), completed by the household coordinators, as well as weekly behavior log and physiological indexes (heart rate and oxygen saturation), used to objectively document our observations and interactions with the cat. These measures were used to determine efficacy of a robotic companion on agitation. Qualitative measures included weekly observational data and staff reports as well as a final questionnaire for the household coordinators to summarize their overall impression of our study on the participants. These measures were used to determine the perceived quality of life of individuals with dementia and their caregivers.

Data was analyzed using parametric t-tests and Wilcoxon Signed Rank test to determine relationships between physiological measures and clinical observations, using Statistical Package for the Social Sciences (SPSS). The qualitative data from the weekly behavior logs were analyzed using NVivo computer programs to sort comments into pre-determined thematic categories. Themes include: interaction, acknowledgment, companionship, compliment, sentiment, need for prompting, no interaction, and aggression.

Use of psychotropic and pain medication was determined by review of the Medication Dispensing Record (MDR) as reported by nursing support staff. MDR was reviewed after completion of data collection.

RESULTS
Table 1. Statistical analysis of the effects of robotic companion cat on agitation, O2 saturation, and heart rate.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Statistical Test</th>
<th>DC Points</th>
<th>Statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitation</td>
<td>Paired t tests</td>
<td>Pre, Post</td>
<td>t = -2.591</td>
<td>.014 **</td>
</tr>
<tr>
<td>O2 Saturation</td>
<td>Wilcoxon Signed Rank Test</td>
<td>Pre, Mid, Post</td>
<td>z = 2.349</td>
<td>.009 **</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Paired t tests</td>
<td>Pre, Mid, Post</td>
<td>t = -2.085</td>
<td>.048 **</td>
</tr>
</tbody>
</table>

CONCLUSIONS
The use of robotic companion cats enhance the well-being and quality of life of individuals with dementia living in a long term care facility by providing companionship and interaction with their environment which helps to reduce anxiety and agitation. Robotic companion cats also reduce the burden placed on caregivers by providing a nonpharmacological intervention for agitation and loneliness.

Due to our small sample size, it is still difficult to draw any major conclusions about the use of nonpharmacological therapy as an adjunct to pharmacological therapy in the long term treatment of dementia. Though these effects were not seen across all participants, the researchers believe that the impact these companion cats have had on a few individuals is significant enough to prompt future research and continue exploring other non-pharmacological options for improving the day to day life of an individual with dementia.

Robotic companion cats provide a cost effective, non-pharmacological intervention for people with dementia or those living in a long term care facility, and their benefits are evident in this study.

ACKNOWLEDGEMENTS
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REFERENCES