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Robot Pets in Dementia Care: An Educational Intervention

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Robot Pets in Dementia Care: An Educational Intervention

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Abstract

Background and Review of Literature: Dementia is a progressive disease of memory and functioning that affects almost six million people in the United States. Elders with dementia often experience depression, as well as behaviors such as agitation or wandering. Antipsychotic medications have been used to manage behaviors in dementia, but these medications can have serious side effects. There is data on effective non-pharmaceutical approaches to behavior management in dementia, but these techniques are not always used. The use of robot pets is a potential intervention, but there are currently no programs that include training about robot pets in dementia care.

Purpose: The purpose of this project was to determine if education can increase nursing home workers' knowledge of robot pets and perception of them as a beneficial intervention in dementia care.

Methods: A quantitative design project was performed using a short training video and pre- and post-questionnaires.

Results: The project demonstrated that a training module of skilled nursing facility staff can increase the knowledge about, and willingness to use, robot pets in dementia care.

Conclusion: The project showed that training increased staff willingness to use robot pets as an intervention in dementia care.

Keywords: *robot pets, pet therapy dementia, cats and dementia, dogs and dementia, adult learning, dementia training*

Introduction

Dementia affects 5.8 million older adults in the U.S., and causes memory loss and alterations in behavior (CDC, 2019). Depression also commonly occurs in dementia. These factors can significantly impact elders' quality of life, and can be distressing to caregivers (Scerri & Scerri, 2019). Antipsychotic medications are sometimes prescribed to decrease dementia-related behaviors, but these medications can cause serious side effects, including death. Therefore, these medications are not recommended for patients with dementia, and non-pharmacological interventions are preferred (Backhouse et al., 2016).

Emerging research shows that interactive robot pets can have a positive impact on the well-being of people with dementia. Robot pets can decrease stress, potentially reducing the need for medications (Liang et al., 2017). However, there is no standard training program to demonstrate the benefits of robot pets as a therapeutic intervention in dementia care.

As part of this capstone project, a brief educational video was developed for nursing home staff about how to use robot pets, and why they are effective in dementia care. The project used pre- and post-questionnaires to measure the effect of the staff education on knowledge, perception of robot pets as beneficial, and willingness to use robot pets in dementia care.

Background

In early 2019, an elder services agency in Western MA received a grant of two hundred battery-powered robot cats and dogs. These companion pets were donated by Joy for All to go to elders living in the the nonprofit's service area. The DNP student, an employee of the nonprofit, was able to give many of the pets to elders living in nursing homes.

The Joy for All pets includes a golden retriever puppy, as well as a robot cat available in different colors. The retail cost is approximately \$90. The battery-powered pets have soft fur, are responsive to touch and voice, and make sounds (such as barking, meowing, or purring).

Many elders were delighted by these pets, naming them or reminiscing about real pets they had known in the past. Many staff told the student that the pets were helpful, especially when residents were hospitalized or receiving hospice care. However, at subsequent visits, staff told the student that some pets were not being used because the resident had lost interest in them. Nursing home workers in MA receive four hours of training on dementia care annually, but no training modules about robot pets were available.

Problem Statement

Elders (ages 65 and older) with dementia almost always experience depression and behavioral changes (e.g. wandering and agitation) as the disease progresses. Interventions such as robot pets are available and provide benefits, but they are not always used in nursing home care. The quantitative project evaluated the efficacy of a training video for nursing home staff in increasing knowledge and positive perception of robot pets as an intervention in dementia care.

Organizational “Gap” Analysis of Project Site

The project site was a skilled nursing facility in Western MA, which has many long-term-care residents with dementia. Residents of most nursing homes are not allowed to have real pets, due to the care and risks involved. Some residents also leave behind pets when they move in. Robot pets are available to fill this gap, and are used in this facility.

However, staff at the project site stated that some residents lose interest in their robot pets over time. Another problem is that residents were awakened at night by the pet, which would start to make noise when a light was turned on. In one instance, the robot pet was put in a closet

to keep the noise down. That problem can be easily prevented by turning the pet “off” or muting it at night.

The pets are also not washable, so care must be taken to avoid spills. They will need to be put away during meal times. Residents with dementia would also enjoy holding a robot pet, but might not seek it out on their own.

One study indicated that guidelines for the use of pet therapy could improve its efficacy (Backhouse et al., 2016); this may also apply to robot pets. Training about dementia care has also been shown to increase caregiver confidence and ability to manage dementia-related behaviors (Scerri and Scerri, 2019). Massachusetts requires eight hours of initial training for new staff, and four hours yearly, on dementia care (Lietzke, n.d.). However, the dementia training programs do not include information on how to use robot pets effectively. The DNP student theorized that a brief training of staff about robot pets may increase their utilization.

Review of the Literature

The purpose of the literature review was to explore evidence for the use of robot pet therapy as a non-pharmacological intervention for nursing home residents with dementia, and the best practices for training caregivers of elders with dementia.

For the initial literature review, this DNP student searched in the autumn of 2019 for studies about dementia interventions in PubMed, CINAHL, and Google Scholar. Keywords used were “robot pets,” “pet therapy dementia,” “cat + dementia,” and “dog + dementia.” The inclusion criteria were articles published within the previous five years, available in English, with information about evidence-based interventions for dementia care. In the summer of 2020, an ancestry search was conducted for additional articles according to the inclusion criteria. Nine

articles ultimately met the inclusion criteria. These include randomized controlled trials using measurement tools, ethnographic case studies, and mixed methods.

An additional search was conducted in the autumn of 2020 for studies about dementia training. The keyword “dementia training” was used in a search of PubMed, CINAHL, and Google Scholar. The ancestry method was also utilized to search for more articles. Four studies met the inclusion criteria (published within the previous five years, available in English, with evidence-based interventions) and were included.

Benefits of Robot Pets

All of the studies that looked for an impact on mood due to robot pets found a positive change. Elders who interacted with a robot pet showed fewer signs of depression, anxiety, or stress (Liang et al., 2017); (Petersen et al., 2017). Robot pets were also observed to provide comfort and reduce loneliness (Koh & Kang, 2018); (Moyle et al., 2016). Elders who handled robot pets had decreased blood pressure (Robinson et al., 2015) and pulse (Koh & Kang, 2018), potential indicators of lowered stress.

Many of the studies were conducted over a short period of time, such as a few days or weeks. Only one of the studies followed participants for longer than three months. One longitudinal study found that robot pets were still in use after six months (Bradwell et al., 2020).

Two of the studies that focused on mood indicators were qualitative, and six were quantitative randomized trials. The qualitative studies focused on perceived indicators of improved mood, such as “smiling, singing, and talking” to the robot pet (Liang et al., 2017, p. 875). One study used the Cornell Scale for Depression in Dementia (Pedersen et al., 2017).

Almost all individuals with dementia experience a behavioral symptom, such as agitation, verbal outbursts, and refusing care. These can be distressing to caregivers and can impact the

elder's quality of life (Karlin et al., 2017). A few studies attempted to measure the use of robot pets in reducing dementia-related behaviors. The results of two studies suggested that robot companion pets are effective at reducing agitation in nursing home residents with dementia (Bradwell et al., 2020); (Gustafsson et al., 2015).

Conversely, two studies of elders living in the community did not find an effect on agitation. One study involved interviews of caregivers to see if visits from real pets decreased dementia-related behaviors, and they did not. However, the authors acknowledged that stronger guidelines for the use of pet therapy may help staff use this intervention (Backhouse et al., 2016). Another study of people with dementia living at home found an improvement in moods; however, it did not find a change in agitation after using a robot pet (Liang et al., 2017).

One study on behaviors was conducted based on qualitative case studies, one study used mixed methods, and two used quantitative data. A measurement tool used in one study was the Cohen-Mansfield Agitation Inventory (Liang et al., 2017). Due to limited data, more research is needed to determine the impact of robot pets on dementia-related behaviors.

Dementia Education

Four studies focused on the benefits of educating caregivers or direct care staff about dementia. Two studies followed training programs that used person-centered care approaches to teach caregivers how to reduce dementia-related behaviors. One program was modeled after a similar training for staff in nursing homes, but was given to family caregivers (Karlin et al., 2017), and one training for family caregivers was developed by the researchers (Tan et al., 2019). Another study followed outcomes of an educational program on direct care staff in nursing homes (Scerri & Scerri, 2019), and one followed the outcomes on residents with dementia following staff training (Reinhardt et al., 2020).

All of the programs that followed caregivers met the goal of improving knowledge. Three included modules on appropriate activities in dementia care and how to provide person-centered care in a comforting environment. While each study used a different training program, all of the studies showed significant benefits of caregiver training. The study of clinical outcomes found improved care, including decreased hospitalizations, following a training program of staff (Reinhardt et al., 2020).

The length of the programs ranged from one day (Tan et al., 2019) to six months (Karlin et al., 2017). A shorter training session may be more accessible to caregivers. Interactive programs are often preferred (Tan et al., 2019), but videos were also used (Karlin et al., 2017).

One measurement tool used was the Management of Behavioral Symptoms of Dementia (MBSB) Scale. The MBSB uses a Likert scale to assess the attitude and knowledge of caregivers in managing dementia-related behaviors (Karlin et al., 2017). Another study used the Pearlin Caregiving Competence Scale (CCS), and the Zarit Burden Interview-Short Version (Tan et al., 2019).

Evidence-Based Practice: Verification of Chosen Option

All of the studies of robot pets identified the benefits of using them in dementia care. Authentic-looking robot pets were also viewed as more effective than non-lifelike pets in three studies (Bradwell et al., 2019); (Latikka et al., 2019); (Moyle et al., 2016). The pets used in this capstone project were realistic-looking robot cats and dogs.

Stress or distress can lead to depression or behavioral symptoms in elders with dementia (Reinhardt et al., 2020). One study found that robot pets can help reduce the use of antipsychotic medication (Jøranson et al., 2015). The finding aligns with the Progressively Lowered Stress Threshold Model, which states that reducing stress could also reduce dementia-related behaviors

(Smith et al., 2004). While there is significant evidence for the use of non-pharmacological interventions, they are not always used. A primary reason for lack of use is “limited knowledge and training of formal and informal care providers” (Karlin et al., 2017, p. 376). Lack of training can impact the quality of life of people with dementia, and contribute to caregiver burnout.

However, many caregivers are willing to learn more about dementia care. In particular, evidence-based training programs that teach patient-centered approaches are beneficial. Ways to make dementia care patient-centered include providing a safe environment, and using activities the elder enjoys (Karlin et al., 2017). Reminiscence therapy was identified to be a helpful non-pharmacological intervention (Backhouse et al., 2016). No research was found that specifically included use of robot pets in dementia training programs.

Theoretical Framework/Evidence Based Practice Model

A theory that guided this DNP project is the Progressively Lowered Stress Threshold (PLST) model. The model is based on the theory that dementia-related behaviors are caused by stress, and elders have more difficulty managing it as their cognitive decline worsens (Smith et al., 2004). The model could explain many behaviors, such as wandering, refusal of care, and agitation, as a response to stress. Therefore, decreasing stress could help improve elders’ well-being and reduce behaviors.

An evidence-based practice model is the guideline *Deprescribing antipsychotics for behavioural and psychological symptoms of dementia and insomnia* (Bjerre et al., 2018). The guideline recommends using alternatives, such as activities, instead of medications that may carry serious side effects. Incorporating non-pharmacological methods into dementia care is a safer way to improve outcomes.

Goals & Objectives

The objective of this DNP project was to determine if training can increase nursing home workers' knowledge of robot pets and perception of them as an effective intervention in dementia care. The goal was that the video would show an improved level of knowledge and improved perception of robot pets as effective. One example is using robot pets to promote positive memories using reminiscence therapy. If the project shows a significant change, the educational video can be used in future dementia trainings.

Participants were employees at a skilled nursing facility in Western MA. The goal is attainable and realistic because it only requires staff to complete a short questionnaire and watch a video, taking 10-20 minutes. The skilled nursing facility uses Joy for All cats and dogs with their residents. The training can be viewed on demand to accommodate staff members' busy schedules.

<i>Goal</i>	<i>Objective(s)</i>	<i>Outcome(s)</i>
<i>- Provide teaching to allow for the use of a robot pet as a nonpharmaceutical approach to dementia care.</i>	<i>- Pre-tests will be conducted before an educational video on using pets, followed by a post-test.</i>	<i>-Staff will show increased knowledge and ability to use robot pets as a non-pharmaceutical intervention.</i>

Project Design

A pre-post questionnaire was developed in this project. A Likert scale was used to measure three nursing home workers' knowledge and perceptions of robot pets. The data was measured before and immediately after viewing a short informational video.

Project Site and Population

The project site is a skilled nursing facility in Western MA. Staff at the site include nurses, Certified Nursing Assistants (CNs), activity personnel, management, and social work. The site had many residents with dementia who received Joy for All robot pets, but staff stated that some of the residents no longer used them, and they were unsure of how to encourage residents to use them.

Setting Facilitators and Barriers

One facilitator is that the student researcher was familiar with the research site and the staff there. Several of the residents had robot pets.

One significant barrier was the Covid-19 pandemic. Visitor restrictions in nursing facilities did not allow for an in-person presentation. In response, the student developed questionnaires and a video that was completed online. Another barrier was limited participation. Staff at SNF facilities already have many tasks to complete. To ensure there were enough participants, a gift card (\$10 value) was offered for participation.

Methods

Measurement Instruments

The measurement tools were pre- and post-intervention questionnaires. The pre-test assessed the participants' knowledge levels and perceptions about robot pets. Questions asked if the participant believed that robot pets are helpful in reducing depression, or helpful in

reminiscence therapy. They also assessed knowledge about how to maintain the pets, including how to turn them off or on or change the batteries. Most of the questions were presented with a Likert scale, with responses of Always, Often, Sometimes, Rarely, or Never. The post-test asked many of the same questions, so that any change in knowledge levels or perception of robot pets could be measured.

Refer to Appendix A.

Data Collection Procedure

The pre- and post-test were developed using Qualtrics. The student sent out an email to the facility, requesting that it be forwarded to staff. Any staff who wished to participate could follow a link in the email to complete the questionnaires and watch the training video. All data were recorded in Qualtrics.

To keep identifying data separate from the questionnaires, participants who wished to receive a gift card were asked to send a separate email with their contact information.

Data Analysis

The first part of data analysis concerned knowledge, to see if the video increased knowledge both of the pets' benefits, and how to use them. The second part concerned perception. The DNP student wanted to learn if the video improved participants' perception of robot pets as helpful to persons with dementia, such as in lessening depression.

Ethical Considerations/Protection of Human Subjects

The University of Massachusetts, Amherst (UMass) Internal Review Board (IRB) approval was obtained prior to initiating the DNP Project. Since the project involved collection and analysis of data, and a brief educational video, the risk to participants was low. The online questionnaire required participants to document that they are 18 years of age or older, and that

they consented before they could begin the survey. One question asked for each participants' job title (e.g., RN, CNA), but no other identifying information was collected.

Results

The project implementation took place from January to March 2021 at a skilled nursing facility in Western MA. Three staff members participated. One identified as an RN or LPN, one as a social work or administrative position, and one as "other." They all self-identified as working with residents with dementia, and having experience with robot pets. Two respondents already rated their knowledge about robot pets as strong, and rated themselves as knowledgeable about the benefits of robot pets. One respondent had increased knowledge and perception.

A Likert scale was used, and scored according to the following: Strongly agree - 5, Agree - 4, Neither agree nor disagree - 3, Disagree - 2, Strongly disagree - 1. There were three participants (n=3).

Results

Question	Pre Score	Post Score
I am familiar with robot pets in dementia care.	4.6	5
Holding or petting a robot cat or dog can help a resident feel less depressed.	4.6	5
Robot pets can be helpful in reminiscence therapy (recalling positive memories).	4.6	5
I know how robot pets work, and how to elicit sounds or movement from them.	4.6	5
I know how to maintain robot pets – for example, how to turn them off or on, change the batteries or clean the "fur."	4.3	4.6

I feel that robot pets are helpful for residents with dementia.	5.6	5
I would like to learn more about robot pets in dementia care.	4.6	4.6

The results were not statistically significant ($p=.317$) because two of the participants already scored their knowledge and perception at the highest level during the pre-test. However, one participant rated their knowledge higher after viewing the training video.

The quantitative data was encouraging. One respondent wrote that residents greatly benefited from the robot pets, writing, “They always want to have it on their lap and are petting it.” Another described the robot pets as bringing comfort to residents.

Discussion

The Covid-19 pandemic posed a significant barrier to the project. Nursing facilities faced significant staffing shortages and outbreaks of the virus. One limitation was that in-person visits and presentations were not possible. It may have been more effective to do an in-person presentation and collect pre and post surveys at that time.

Many staff members at the site were already knowledgeable about robot pets, and they are currently being used. The results imply that one respondent had increased knowledge after viewing the presentation. The survey was not able to capture a large amount of nursing assistants and activity staff, the direct caregivers who would benefit most from this training, so future trainings should focus on this group.

The literature review showed promising benefits of dementia training. One study suggested that caregivers prefer in-person trainings (Karlin et al., 2017). The information

obtained by the DNP student will be presented to stakeholders, and can lead to future trainings to teach about the use of robot pets in dementia care.

To sustain this project, an in-person training can be developed that would allow newer staff to handle a robot pet to see how to turn it off and on and change the batteries. At that time, training can also focus on the benefits of robot pets in person centered dementia care. Guidelines can be developed for both staff and family caregivers.

A barrier to widespread implementation remains the cost of robot pets; Joy for All pets cost approximately \$90, and facilities do not currently provide them for residents. Most robot pets are donated, or purchased by nursing home residents' families. However, "the isolation caused by the coronavirus, not only in facilities but also among seniors living alone in their homes, has intensified interest" in robot pets, and has led to at least one public program covering the cost for their use in dementia care (Span, 2020).

Conclusion

Dementia is a progressive illness that can cause significant memory loss, behavioral changes, and depression. There are risks from using medications to treat behavioral changes, so non-pharmacological interventions are preferred. Robot pets can have a positive impact on the well-being of people with dementia, but they are not always used. Caregivers and elders may benefit by learning how to use robot pets.

The project showed some evidence that an educational tool for nursing home staff is effective in increasing their knowledge and positive perception of robot pets. Some staff also rated their knowledge as high, which is encouraging in that robot pets are being used. Future implications include the development of interactive trainings for direct care nursing facility staff, as well as family members. Due to the benefits of robot pets, more program may look to

purchase them for residents. Ultimately, more elders with dementia may benefit from the use of robot pets.

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Appendix

Appendix A – Measurement Tool

Pre-Survey

1. What is your position at [nursing home name]?

- RN/LPN
- CNA
- Activity staff
- Administrative or social work
- Other

2. How often do you work with residents with dementia during your job duties?

Always

Often

Sometimes

Rarely

Never

3. Have you ever had experience using robot pets in dementia care?

Yes

No

4. If you are using them, please share your experience. _____ (optional question)

5. If not, is there a reason why you do not use robot pets? _____ (optional question)

Please indicate your agreement with the following statements:

6. I am familiar with robot pets in dementia care.

Strongly agree

Agree

Neither agree nor disagree

Disagree

Strongly disagree

7. Holding or petting a robot cat or dog can help a resident feel less depressed.

Strongly agree

Agree

Neither agree nor disagree

Disagree

Strongly disagree

8. Robot pets can be helpful in reminiscence therapy (recalling positive memories).

Strongly agree

Agree

Neither agree nor disagree

Disagree

Strongly disagree

9. I know how robot pets work, and how to elicit sounds or movement from them.

Strongly agree

Agree

Neither agree nor disagree

Disagree

Strongly disagree

10. I know how to maintain robot pets – for example, how turn them off or on, change the batteries or clean the “fur.”

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

11. I feel that robot pets are helpful for residents with dementia.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

13. I would like to learn more about robot pets in dementia care.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

14. If you do not currently use a robot pet in dementia care, are you willing to use them in the future? (optional question)

Yes
No
Not sure

Please view the following video before continuing: <https://www.youtube.com/watch?v=WAUaBIu0W7c>

Post-Survey

1. The training increased my knowledge and understanding of robot pets in dementia care.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

2. Holding or petting a robot cat or dog can help a resident feel less depressed.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

3. Robot pets can be helpful in reminiscence therapy (recalling positive memories).

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

4. I know how robot pets work, and how to elicit sounds or movement from them.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

5. I know how to maintain robot pets – for example, how turn them off or on, change the batteries or clean the “fur.”

Strongly agree

Agree
Neither agree nor disagree
Disagree
Strongly disagree

6. Watching the video made me more likely to use robot pets in dementia care.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

7. I feel that robot pets are helpful for residents with dementia.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

8. I plan to use robot pets in dementia care (for example, reminiscence therapy). (optional question)

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

9. If not, is there a reason why you do not use robot pets? _____
(optional question)

10. I would like to learn more about robot pets in dementia care.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

11. I would recommend this training to others.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

12. If you do not currently use a robot pet in dementia care, are you willing to use them in the future? (optional question)

Yes
No
Not sure

Appendix B – Timeline

Task	Nov	Dec	Jan	Feb	Mar	April
Receive IRB approval	X					
Recruitment of eligible participants			X	X	X	
Data collection				X	X	X
Post-test and analysis of outcomes						
Results presented to local providers						X