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Abby Denby

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The Use of Life-Like Robotic Animals in the Acute Care Setting to Assist in the Care of
Patients with Dementia

Abby Denby

A Clinical Research Project submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Doctor of Nursing Practice

School of Nursing

December 2020

FACULTY COMMITTEE:

DNP Project Chair: Dr. Linda Hulton

DNP Project Member: Dr. Patra Reed

Dedication Page

This is dedicated to my Dad, James Nespeco "Jimmy" (March 26, 1941 - September 26, 2017). An avid dog lover who found peace in his PetPal during his battle with dementia and the reason this program began at this Hospital in 2018. This pilot project is just the beginning of my efforts to have hospitals all over the country provide such a wonderful alternative therapy to patients with dementia.

Until we meet again Dad...love you always.

Acknowledgments

I would first like to thank my Committee Chair, Dr. Linda Hulton. At one of the most essential times in the DNP program, we faced the challenges of a pandemic. Dr. Hulton was the glue holding us together; her calming nature and unwavering support were invaluable. One of the best peers and preceptor I could ask for, Dr. Patra Reed. Thank you for your guidance, expertise and support. My husband Chris, thank you for your patience, picking up the slack and being so supportive. To my children, Christopher, Nick, Sophia and Benny, you were my motivation. Thank you for your understanding and support, you never complained when I had to do school work. To my Mom, brother and sister, you won't have to hear about school again. Thanks for listening, pushing me and always having my back. To all of my friends who I have often neglected during this process, thank you for being true friends and now we can pick up where we left off.

Table of Contents

Dedication Page	ii
Acknowledgments.....	iii
List of Figures	v
List of Tables	vi
Abstract	vii
Significance and Background	1
Introduction.....	1
Literature Review.....	2
Problem Statement and Purpose	5
Theoretical Model.....	5
Project Study Design.....	6
Methodology	6
Setting and Population	6
Instrumentation	7
Procedure	7
Results.....	9
Overview and Analysis.....	9
Pittsburgh Agitation Scores.	9
Chart Review.	10
Nurse Survey.....	11
Ethics and Human Subjects Protection.....	11
Discussion.....	12
Conclusion.....	14
Implications.....	14
Figures.....	16
Tables.....	29
Appendix.....	31
References.....	37

List of Tables

Table 1 Literature Review Table.....	19
Table 2 Chart Review Data.....	28
Table 3 Nurse Survey Questions 1-6 Results	29
Table 4 Nurse Survey Questions 7-8 Results.....	30

List of Figures

Figure 1. PetPals and James “Jimmy” Nespeco and his PetPal.....	16
Figure 2. Total Average Pittsburgh Agitation Scale Score.....	17
Figure 3. Average Subscale Scores of Pittsburgh Agitations Scale.....	18

Abstract

The purpose of this pilot project was to describe the effect of life-like robotic animals on the nurses' ability to provide care, patients' level of agitation, use of antipsychotic medications, restraint and sitter use for patients with dementia in an acute care setting. Nurses report challenges and feelings of helplessness while caring for patients with dementia. Dementia may cause depression, agitation, aggression (physical or verbal) and a decrease quality of life. Animal Assisted Therapy (ATT) is a growing therapy in many healthcare settings but there is a lack of literature specifically related to the use of AAT in the acute care setting to decrease agitation. This was an evidence-based pilot project using retrospective chart review and observational data collection using the Pittsburgh Agitation Scale (n = 4). In addition, a web-based survey platform was utilized for the post-intervention nurse survey (n = 21). The results of the nurse survey supports the use of life-like robotic animals to decrease the difficulty of completing particular tasks for the nurses. Using the sign test, there was a statistical difference ($p < 0.05$) when comparing the nurses' ability to perform the tasks pre and post utilization of the life-like robotic animal. Ninety percent of nurses who responded to the survey strongly agreed or agreed that they felt less helpless and more hopeful and felt caring for the patient with dementia was more manageable after the patient received the robotic animal. Each of the four patients included in the pilot study showed a decrease in all categories of the Pittsburgh Agitation Scale after receiving the robotic animal. There was an overall decrease in use of antipsychotic medications and sitter use while restraint use remained consistent throughout the data collection period. More research is needed however, based on the results of this pilot project life-like robotic animals combined with other evidence-based

interventions could have a significant impact on the care of patients with dementia and agitation while in the acute-care setting.

Keywords: dementia, Alzheimer's, Animal Assisted Therapy, robotic animals and acute care, Pittsburgh Agitation Scale,

Significance and Background

Introduction

Healthcare providers in the acute care setting are caring for more patients with dementia and nurses have reported challenges while caring for patients with dementia. In the United States, approximately 4.7 million Americans in 2010 were living with the disease and up to 13.8 million projected by 2050 (Herbert, Weuve, Scherr & Evans, 2013). A qualitative secondary analysis was conducted and findings showed nurses face uncertainty when caring for patients with dementia and there is variation among nurses in their response. This study suggests that organizations give every nurse the chance to provide person-centered care (Pinkert, et al., 2018). A recent study by Halpern et al. (2019), showed the prevalence of agitation in patients with Alzheimer's Dementia (AD) was 44.6% overall and 61.3% in patients with staged AD.

Interviewing nurses working on medical-surgical units at a community-based hospital in Central Virginia has brought forward challenging themes when providing care to patients with dementia. The themes include, agitation with physically abusive behavior toward staff, fear and anxiety leading to a refusal of care and refusal to take medications, high risk for wandering and falling and an overall sense of feeling helpless by the staff. During the interviews, the nurses discussed current options for distraction techniques like the use of activity aprons, music, folding laundry and having a companion in the room. There are times when they feel that is not enough and they still have difficulties providing care to the patient (D. McGee, J. Fox, P. Scott, A. Eanes, S. Glatt, J. Brown, H. Whitworth personal communication November 13, 2018). During the interviews with staff it was determined that many patients responded well when the therapy dogs came to the nursing units and visited with patients.

Literature Review

Caring for patients who have dementia and agitation can create challenges for staff to provide care therefore, innovative solutions in the acute care setting are essential. A review of the literature supported that the majority of the research related to animal assisted therapy (AAT) or pet therapy and patients with dementia have been done in the setting of nursing homes (see Table 1.). Throughout all of the studies within the literature review, the majority of the subjects were women (71.3%). While the majority of the primary studies reviewed used live dogs only, two of the nine primary studies reviewed that included AAT utilized both living and toy/robotic animals (Greer et al., 2001 & Thodberg et al., 2016). Joranson et al., 2015 utilized only robotic pets. Themes measured throughout the literature were depression, agitation, effects on the Mini-Mental State Exam (MMSE) and quality of life.

Six primary studies confirmed a decrease in depression symptoms with AAT; four showed statistical significance (Menna et al., 2016; Moretti et al., 2011; Joranson et al., 2015; Olsen et al., 2016). Olsen et al., 2015, Joransen et al., and Petersen et al., utilized a Norwegian version of the Cornell Scale for Depression (CSD), which has 19 symptoms of depression in five domains. This depression scale is rated using the following; mild, mild/intermittent, severe. Olsen et al., included participants who were classified into three groups of dementia, mild, moderate or severe and then the results of the CSD were analyzed. After two, 30-minute sessions a week for twelve weeks of AAT, there was clinically and statistically significant ($p=0.001$) improvement in depression scores for participants with severe dementia. Those with mild to moderate dementia did not show a significant improvement in their CDS scores. The Joransen study was similar in that

there was significant improvement ($p=0.028$, 95% confidence interval) of CSD scores in the intervention group who had therapy with a robot-assisted seal. There was a clinically significant ($p=0.001$) improvement in the CSD scores of the intervention group in the Petersen study. The Petersen study intervention was treatment with a PARO robotic pet three times a week for 20-minutes over twelve weeks. The Dementia Mood Assessment Scale (DMAS) is used specifically to assess depression in people with dementia and assesses 24 symptoms. The scoring of the scale is based on a 7-point rating scale with zero representing normal and six representing severely impaired. The DMAS was utilized in the Majic (2013) case-control trial. There was a significant ($p=0.003$) improvement of the intervention groups' DMAS score after AAT that occurred over 10-weeks. Moretti, et al. and Menna et al., utilized the Geriatric Depression Scale (GDS). Moretti utilized the scale on participants before and after 6 weeks of pet therapy interventions. There was improvement on the pet therapy group over the control group related to the GDS ($p=0.070$). Menna utilized the scale before and after six months of AAT which occurred 45-minutes a week for six months. Statistical improvement was found ($p=0.000$) in the GDS score of the intervention group compared to the control group.

Agitation improved with the use of AAT in three of the primary studies and two were statistically significant (Joranson et al., 2015; McCabe et al., 2002). The Joransen study (2015) and Olsen study (Olsen, 2016) utilized the Brief Agitation Rating Scale. There was a statistically significant difference ($p=0.048$) in the intervention group who participated in AAT than the control group in the Joransen study (robot seal) but not in the Olsen study (dog). Majic et al., 2013, scored agitation levels according to the 29-

item, Cohen-Mansfield Agitation Inventory. Although there was some improvement, there was no significant improvement in agitation between the control and intervention groups.

The MMSE was a measurement tool used in five studies and although improvement was noted with AAT in four of the studies, only statistical significant improvement in two of the studies (Menna et al., 2016; Joranson et al., 2015). The Moretti study did show an increase in the MMSE score in control group by two points, there was not statistical significance. There was a two-fold increase of mean MMSE scores for the pet therapy group. The MMSE did decrease over time in the Thoberg study but was not effected by visit type (live or toy animal therapy).

Quality of life was measured throughout three studies and there were findings consistent with improved quality of life for those patients who participated in AAT (Olsen et al., 2016; Moretti et al., 2011; Wood et al., 2017). Moretti study included pet therapy intervention for 90-minutes once a week for six weeks and all of the participants found the experience to be enjoyable and interesting leaving a positive effect on the self-perceived quality of life. The Olsen (2016) study utilized Quality of Life in Late Stage Dementia scale which showed the AAT participants effect on quality of life was significant. A qualitative study by Swall, et al. (2016), established three subthemes and one theme from the interviews of dog handlers. An overview of the three subthemes included being an unintentional listener, responsive to the emotions of the person with dementia and an existence free from illness was created for the person with dementia. The overall theme from the interviews concluded there was respite of illness for persons with dementia when therapy dog handlers visited them (Swall, et al, 2016).

In summary, the results are promising for the use of AAT to improve the MMSE and quality of life, decrease depression symptoms and agitation of patients with dementia. There was some inconsistency among instruments used to measure depression, agitation and quality of life however; all of the instruments were valid, evidence-based, reliable instruments like the Mini-Mental State Exam and the Geriatric Depression Scale.

Problem Statement and Purpose

There is a gap in the literature about utilizing animal assisted therapy on patients diagnosed with dementia in the acute care setting. Patients with dementia in the acute care setting can become agitated, refuse care, require restraints, sitters or antipsychotic medications to manage their agitation and subsequently lead to nurses feeling tasks are difficult to complete while providing care to a patient with dementia who is agitated. Utilization of living animals for animal assisted therapy is a point-in-time resource while utilization of a life-like, robotic animal that remains with the patient permanently is a more consistent solution.

The purpose of this pilot project is to describe the effect of life-like robotic animals on the nurses' ability to provide care, patients' level of agitation, use of antipsychotic medications, restraint and sitter use for patients with dementia in an acute care setting.

Theoretical Model

The framework identified for this pilot was Jean Watson's Caring Theory (see Appendix A). Watson defines nursing as "a human science of persons and human health-

illness experiences that are mediated by professional, personal, scientific, esthetic and ethical human transactions” and she believes holistic health care is central to caring as a nurse. Watson’s model makes seven assumptions and ten primary carative factors, one of which is the provision for a supportive, protective and/or corrective mental, physical, socio-cultural, and spiritual environment. The carative factor involves interdependent internal and external variables. Those variables are manipulated by the nurse in order to provide support and protection for the patient’s mental and physical health. The nurse must provide comfort, privacy, and safety as part of the carative factor. The utilization of PetPals is a holistic approach to provide that support, protection, comfort and safety to the patient.

Project Study Design

This was an evidence-based project with a short-term longitudinal design used to evaluate the effectiveness of life-like, robotic animals on the nurses’ ability to provide care, patients’ level of agitation, use of antipsychotic medications, restraint and sitter use for patients with dementia in an acute care setting. The data collection period was June through September 2020.

Methodology

Setting and Population

The pilot project was conducted at a 176-bed, not for profit community hospital in Central Virginia. Nurses and appropriate dementia patients on four of the inpatient units (102 beds combined) participated in the pilot. Inclusion criteria: Patients admitted to one of the four-inpatient units participating in the project, diagnosed with Dementia or

Alzheimer's', estimated to remain hospitalized for at least 24 hours and were agitated or refusing care. Exclusion Criteria: Patients with dementia with an expected length of stay less than 24 hours, or any patient with a discharge order at the time the agitation or refusal of care began and patients with dementia who are not agitated or refusing care.

Instrumentation

Utilizing the electronic medical record and the Pittsburgh Agitation Scale (see Appendix B) this project described the effect of life-like robotic cats and dogs (PetPals) on the ability for nurses to provide care, use of antipsychotic medications, restraint, sitter use as well as the overall score and subcategory scores of the Pittsburgh Agitation Scale. This scale has shown good interrater reliability and validity (Rosen et al., 1994). The PAS includes four behavior groups; aberrant vocalization, motor agitation, aggressiveness and resisting care. Each one scored based on a zero to four scale where zero means the behavior is not present and four means the behavior has a significant presence during the rating period. Another component of the project was to obtain feedback from nurses who cared for a patient before and after they received a PetPal. An investigator created web-based survey composed by content experts was sent to the unit nurses to measure the difference in difficulty level with medication administration, activities of daily living and the ability to keep the patient in the bed or chair until staff arrived to provide assistance and their overall feeling of helplessness, hopefulness and management of the patient before and after the PetPal.

Procedure

Once approval from the Institutional Review Board at the author's clinical site and university was obtained, education and data collection began. The primary

investigator provided nurse education on how to utilize the PAS to ensure interrater reliability. Education was conducted during staff meetings and morning huddles on the units involved in the pilot and the investigator did continuous rounding on all of the units and speaking with staff directly for any concerns.

PetPals are life-like, interactive robotic cats and dogs (Figure 1). The PetPals have fur, the cat meows, purrs and moves its head and rolls onto its back and the dog pants, barks, wags its tail and moves its head in response to sound. There is an option to have the sounds and movement turned off or you can just turn off the sounds while allowing the movement to continue.

Data collection occurred between June and September. The primary investigator recruited participants by asking the nurses (almost daily) on the participating units if there were any patients admitted to their unit who had dementia. If they did, the investigator would ask if the patient was agitated or physically or verbally aggressive toward staff. If the patient met the inclusion criteria, the consent process started. The investigator would read the patient chart to determine who the patient's legal decision maker was and contact them to get consent. Three of the four consents were completed via telephone and one was in person. After the consent was obtained, the investigator spoke to the nurse caring for the patient and explained each component of the data collection process and before giving the PetPal to the patient, asked him/her to complete the PAS assessing the behaviors of the patient. The patient was given a PetPal and the date and time of the patient receiving the animal documented on the PAS. The nurses completed the PAS every six hours for 24 hours after the patient received PetPal. The PAS documents were collected by the investigator and then locked in a file cabinet in a

locked, private office. The other variables collected during the patients' hospital stay were obtained through a retrospective chart review. From the retrospective chart reviews, patient demographics were collected to include patient's age, sex at birth, brief medical history and reason for hospital admission as well as antipsychotic medication, restraint and sitter use. The antipsychotic medication, restraint and sitter use data were collected for the twenty-four hours before and after the PetPal implementation. To collect feedback about the impact the PetPals have on nurses caring for the patients, a survey link was sent via email to all nurses working on the four participating units. The survey (see Appendix C) provided a way for nurses to anonymously provide their experience caring for patients prior to and after receiving a PetPal.

Results

Overview and Analysis

All survey data was entered into Microsoft Excel by the primary investigator to perform statistical analysis. The outcomes in the review included results of the PAS comparison, the antipsychotic medication, restraint and sitter use by patient and the nurse survey results.

Pittsburgh Agitation Scores. Despite low numbers of patients who participated in the study (n=4), there was a note-worthy decrease in the average total score of the PAS before and after utilization of the PetPal (see Figure 2). The average total score for the PAS before utilization of the PetPal being 3.44 (0 = not present – 4 = significant presence) and the average total scores for each six hour measurement period after utilization of the Petpal ranged from 0.75 – 1.31. Each subscale of the PAS; aberrant vocalization, motor agitation, aggressiveness and resisting care showed a decrease in

scores after the PetPal was provided to the patient. Aberrant vocalization average score pre-intervention was 2.5 and ranged between 0.75 – 1.5 for each six-hour measurement period post-intervention. The average motor agitation score pre-intervention was 3.5 while the post-intervention average score ranged between 0.5 – 1.5 for each six-hour measurement period. Average scores for aggressiveness and resisting care had the same average score pre-intervention of 4. The post-intervention average scores for each six-hour measurement period ranged between 1.25 – 2.25 and 1 – 2.25 respectively (see Figure 3).

Chart Review. Table 2 summarizes the participant demographics, medical history and admitting diagnosis as well as antipsychotic medication, restraint and sitter use for the twenty-four hours before and twenty-four hours after the PetPal. Review of the data determined that antipsychotic medication use decreased with three out of the four patients. Between the three patients, there were nine doses of antipsychotic medications given within twenty-four hours before the PetPal and three total doses given within the twenty-four hours after the PetPal received. One patient had a dose ordered prior to receiving the PetPal and it was administered an hour and a half after receipt of the PetPal with no subsequent doses. Also noted in the chart review, sitter use for one patient was ceased within six hours of having the PetPal and the other patient was using a sitter and restraints (four side rails) but transitioned to a different type of restraint (enclosed bed) with discontinuation of a sitter. For the two patients in restraints, the use remained consistent with the exception of one patient who was able to come out of restraints for only two hours after receiving the PetPal.

Nurse Survey. The nurse survey was completed by twenty-one nurses. Answers from questions one through six of the nurse survey (not difficult, somewhat difficult, very difficult, and too difficult to complete the task) were converted to numbers (0, 1, 2 and 3 respectively) to complete a statistical analysis of the responses about difficulty of care before and after the PetPal using the sign test. The sign test is a non-parametric test for consistent differences between pairs of observations like pre and post data. It is referred to as a sign test because a positive (+) or negative (-) sign is allocated to the difference of each of the pre to post measures and is based on the direction of the positive and negative sign of the observation instead of the numeric value. Questions seven and eight were questions about the nurses' feelings related to caring for the patient with dementia after the PetPal was given and results formatted based on raw data.

The results of the sign test demonstrated a statistically significant improvement ($p < 0.05$) before and after the use of a PetPal in each of the measured tasks; medication administration, ADLs and keeping the patient in the bed or chair until assistance was available (see Table 3). As noted in Table 4, ninety percent of the nurses who completed the survey either strongly agreed or agreed that they felt less helpless, more hopeful and caring for their patient was more manageable (questions seven and eight) after they received the PetPal.

Ethics and Human Subjects Protection

The investigator did not perceive more than minimal risks from involvement in this study (that is, no risks beyond the risks associated with everyday life). Potential benefits from participating in this study included: increased knowledge of the impact PetPals have on the patient population with dementia while in the acute care setting;

decrease in agitation, improved quality of life and the ability for clinicians to provide appropriate care to the patient population. The staff survey was optional and anonymous so the primary investigator will not be able to determine who completed the surveys. The patients' legal guardian gave consent for the patient participants. The email sent to the staff with the survey link noted consent by completing the survey.

Discussion

Utilization of PetPals for patients with dementia was already a standard of practice at the hospital and funded through the hospital foundation. The purpose of the pilot project was to obtain data around the use of the PetPals and describe the effectiveness and implications for nurses and patients. The sample size for the patient participants was very small and further research will be needed. However, the pilot project was essential as there were lessons learned and modifications will be made for the research project. Although the total patient participants were too few (n=4) to demonstrate statistical significance, there was an overall decrease in agitation, antipsychotic medication and sitter use which demonstrates clinical significance.

COVID-19 had a significant impact on the pilot project. The initial IRB approval was obtained in March 2020. Due challenges and mandates related to COVID-19, on April 6, 2020 the IRB committee sent notification to all primary investigator to suspend projects that did not have a high direct benefit to the participants with no other approved treatment and the underlying condition life threatening and could not be delayed. The enrollment suspension lifted May 21, 2020 so data collect could start. The original IRB approval included three inpatient units with a data collection period through July

however, due to low participation and patient placement changes at the hospital related to COVID-19 addendums were submitted throughout the process to include a fourth inpatient unit and extend the data collection period to October 1, 2020. The primary investigator provided more education to staff due to the delay between the original education and the data collection beginning. Education was also provided to the additional inpatient unit staff by rounding with staff, through email and just in time training and communication with each nurse when a patient was enrolled in the project.

Obtaining consents for patient participation was challenging during COVID-19 because visitation was extremely limited so discussions about the project were completed over the phone and the legal guardians were not able to see the patient behaviors first hand and were not able to get a full understanding of a PetPal without seeing it in person to touch, hear and see how the patient and PetPal interact with one another. Although there were some appropriate candidates, any patients with suspected or confirmed COVID were not enrolled in the pilot project due to infection prevention concerns.

Other limitations include the potential for recollection bias since the survey was sent to nurses in September so they were not completing the survey immediately after caring for their patient who was using a PetPal. The PAS was completed in six hour measurement periods for behavior over the six hours which could have lapsed over two shifts, therefore the second nurse completed the survey based on what he or she observed coupled with verbal information given by the previous nurse.

Conclusion

The upward trajectory of dementia diagnosis in the United States, paired with the prevalence of agitation in the dementia population could present challenges for clinicians in the acute care settings while caring for this population. Animal assisted therapy and robot seal therapy have been effective strategies in decreasing agitation and depression and/or improving quality of life for patients with dementia in the long-term care setting. The statistically significant outcomes associated with the nurse survey has created a platform for future data collection from clinicians. Although this pilot project had a limited sample size of patients who enrolled and completed the project, there is clinical significance with the use of PetPals.

Implications

More evidence from a research project with a larger sample in needed for statistically significant data related to the use of robotic pet therapy to decrease agitation of dementia patients in the acute care setting. This study was able to describe a clinically significant improvement in the patients' level of agitation. The nurses provided very positive feedback about the use of the animals so there is an opportunity for acute care facilities to utilize life-like robotic animals with this patient population. This study was performed in one of twelve hospitals in a healthcare system so there is an opportunity to provide the current practice guidelines with the rest of the hospitals in the system. This is a noninvasive, innovative intervention that acute care settings can implement into routine practice. Dissemination of this study will provide education to staff in other facilities. A future study with a larger sample size will provide more robust data to further support the

use of life-like robotic cats and dogs in the acute care setting to assist in the care of patients with dementia.

Figures

Figure 1. PetPals (a.) and James “Jimmy” Nespeco with his PetPal



Figure 2. Total Average Pittsburgh Agitation Scale Score

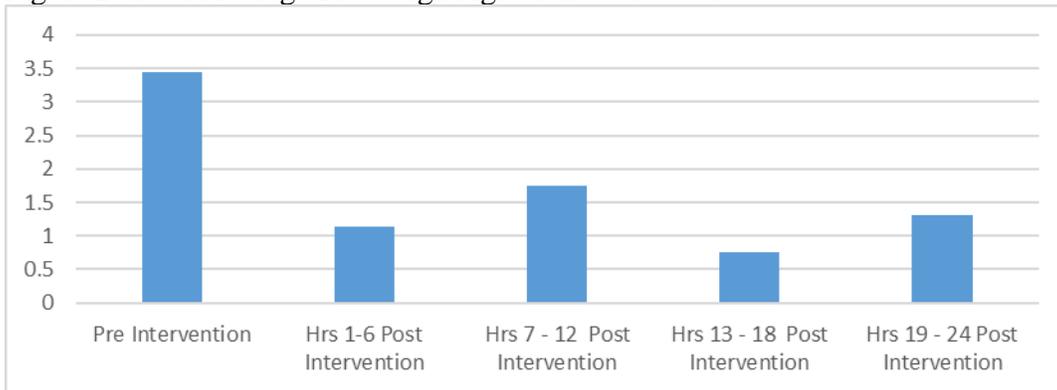
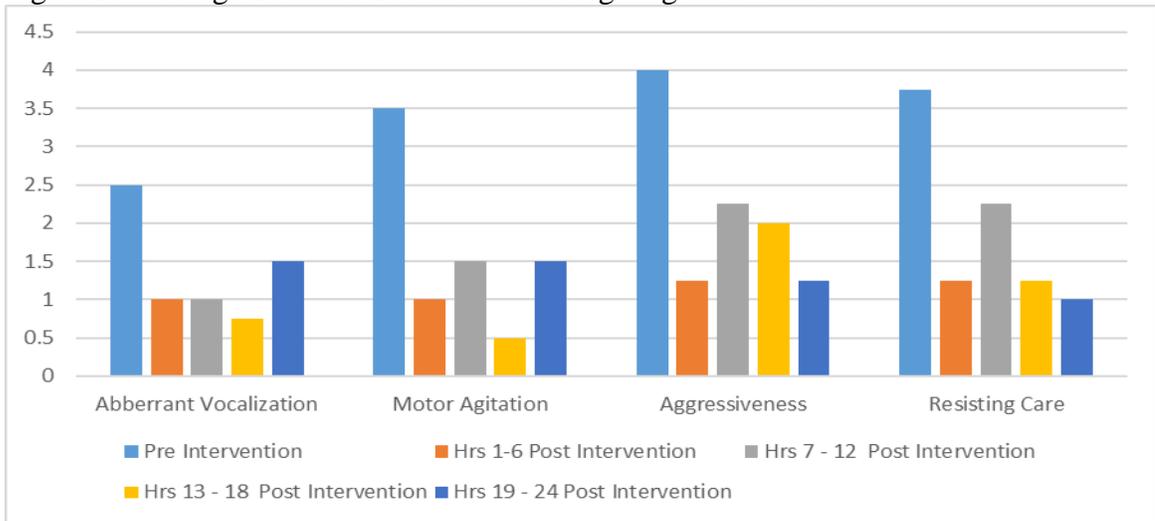


Figure 3. Average Subscale Scores of Pittsburgh Agitation Scale



Tables

Table 1. Literature Review

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Briones, M. Á. 2019	Non-Randomised Control Study	Assess if dog assisted therapy enhances quality of life in institutionalized public care home persons with dementia and its effects on the use of psychotropic medications. A dog-assisted intervention was conducted	n=34 residents of a public care home in Spain.	Supports hypothesis that Animal Assisted Therapy may contribute to enhancing quality of life for institutionalized dementia patients. The only difference (significant) was found with the Bartel test showing an improvement in quality of life..	The control and intervention group noted an increase in quality of life, the control group did see the dogs every visit in passing as they went to the room for intervention so the increase in quality of life for both groups suggests that different levels of animal interaction could benefit. Small sample size, one session per week may not have been sufficient, questionnaires administered by different
Kårefjærd, A. 2019	One-group pre-test post-test study design. A retrospective study from nursing staff assessment of residents QOL	Investigate effects of dog-assisted intervention on quality of life in nursing home residents with dementia. One-group pre-test post-test study design.	n=66 3 different nursing homes in a medium sized municipality – all residents with moderate to severe dementia who had DAI initiated January 2014 – December 2016.	Total Quality of Life in Late-Stage Dementia scale (QUALID) scores increased significantly from pre assessment to post test 1 and declined again at post test 2.	Indications include DAI can have positive effects on QoL in people with moderate to severe dementia (with a significant decrease in signs of sadness and discomfort which are recognized as symptoms of agitation) DAI can be helpful to reduce symptoms of agitation in the same population

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Nordgren, L. 2014	Quasi-experimental longitudinal interventional design for a pilot study	a pilot study to see the effects of animal-assisted therapy on behavioral and/or psychological symptoms in dementia.	An 84-year old female nursing home resident with vascular dementia	Some observed changes in the participant that can be assumed to be related to the AAT but no certain conclusions can be made due to one participant as it being a pilot study.	Results are not generalizable but there is physical, psychological and/or social training with certified therapy dogs can have effects on behavioral and psychological symptoms in people with dementia
Swall, A. 2016	Qualitative Study	Understand the experiences of therapy dog holders when they visit older persons with dementia	Interviews with 9 dog holders	The theme resulting from the analysis was “respite from the burden of illness for persons with dementia”	Therapy dog-holders and their dogs visiting persons with dementia can be a non-pharmacologic intervention that could result in temporary respite for the illness.
Menna, L.F. 2016	A pilot study	Evaluate the efficacy of animal-assisted therapy in elderly patients affected by Alzheimer’s disease based on the reality orientation protocol	Random selection of 50 patients in an Alzheimer’s Centre with mild to moderate Alzheimer’s Disease and absence of behavioral disorders.	Data showed statistically significant improvement of the GDS and the MMSE in the ROT and the AAT, but especially the AAT group.	Small sample size and considered a preliminary observation because the study design was not randomized or double blinded. A limited neuropsychological battery was used and over a short period of time (6 months) so unclear of impact over time. There is proof AAT interventions are applicable and effective in improving mood and stimulating cognition

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Moretti, F. 2011	Quantitative study	Evaluate pet therapy effect on perceived quality of life, mood and cognitive function on elderly patients diagnosed with dementia, depression and psychosis.	2 groups: Pet therapy group (n=10) Control group (n=11) From a nursing home in a wealthy area of Northern Italy	Improvement in GDS was clear in both groups. There was an improvement in the MMSE for the pet therapy group however, not statistically significant. The perception of quality of life improved in 5 of the pet therapy subjects and 2 of the control subjects. Pet therapy improved the depressive symptoms of the subjects on this study by 50% and the MMSE improvement was twofold for the pet therapy group over the control group.	Limitations include: Small sample size that was not randomized or double blinded. Short term study (6 weeks). Behavioral disturbances were not collected and the battery of neuropsychological tests were limited. All participants, except 1 were women with a poor educational background so may not be generalizable. Overall the data supports the efficacy of pet therapy on older patients who are diagnosed with a cognitive disorder and other psychological disorders.
Greer, K.L. 2001		This study was intended to determine the effects of toy vs. live cat stimuli on verbal communication of elderly patients diagnosed with dementia and living in a nursing home	6 females with no history of depression and classified with moderate dementia based on the MMSE	Live cats had a greater impact (improvement) on words and initiations over toy cats. The average total words actually decreased from baseline with the toy cats.	Small sample size, trouble hearing by participant, baseline voice quality, dozing off during sessions so better screening of participants may decrease confounding variables. Only female participants. Overall the use of live cats increased the words and initiations however, more research is needed.

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Swall, A. 2017	Phenomenological hermeneutic study	Illuminate meanings of care for people with Alzheimer's in their encounters with a therapy dog. Understanding the lived experience of people with Alzheimer's providing care for a dog	Municipal nursing home in Sweden. n=5 residents with medium to severe Alzheimer's dementia.	There was a main theme, 2 themes and 4 sub themes that resulted from the text created. Main: Using one's own resources and abilities as a human being Theme 1: Letting one's feelings lead the way with the dog's best interest in mind Sub themes: being affectionate towards the dog and being concerned for the dog. Theme 2: Being close and at a distance. Subthemes: Becoming significant for the dog and distancing oneself from the dog at that moment.	The dog may have helped participants find personal meaning, be calm and content, reduce aggression, reveal memories from the past, become more empowered and secure and create moments of lucidity. The filming could have been intimidating to participants. Although the sample was small, quality is more important than quantity with this type of study
Majic, T. 2013	Matched case-control trial	Investigating the efficacy of Animal assisted therapy on symptoms of depression and agitation in nursing home residents with dementia	65 nursing home residents who had a diagnosis of dementia. Mean age: 81.8 years.	Although the control group showed an increase in agitation and depression over the 10 weeks, the intervention group improved.	Animal assisted therapy may delay progression of depression and agitation in nursing home residents with dementia.

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Thodberg, K. 2016	Randomized complete block design study	The effects of biweekly dog visits on the psychiatric well-being and sleep patterns of elderly people.	124 residents from 4 nursing homes in Denmark including a high prevalence of dementia (different stages).	23 residents dropped out. Dog was assigned to 8 residents, seal; 8 and toy cat; 7. Overall, sleep efficiency was not affected. During the experimental time the cognitive function became worse but the GDS score decreased showing a decrease in depressive symptoms during experiment. No effect noted on BMI.	Limitations include short visits (10min), only used large dogs. Conclusion for this study was that animal visits did not affect depression, cognitive function or BMI. There was a transient effect on sleep but only during 1 week of the experiment.
Joranson, N. 2015	Cluster-randomized Controlled trial	Examine how robot-assisted group activity with a robot seal effects agitation and depression in nursing home residents with moderate to severe depression.	60 residents with a dementia or cognitive impairment diagnosis from 10 units from nursing homes in 3 counties.	No significant difference in depression and agitation between baseline and the first measurement period, there were statistically significant differences on agitation and depression between the control group and the intervention group; symptoms improved for intervention group, worse for the control group	The robotic seal used in this study showed long-term effects on agitation and depression for elderly nursing home residents with dementia.

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Wood, W. 2015	Systematic mapping review	Determine in what way animal assisted therapy for institutionalized adults with dementia map onto the domains and subdomains of the Lived Environment Life Quality model.	10 studies	All 10-studies concluded that dog-assisted therapy was a benefit to those with dementia living in an institution. There were statistically significant findings to not mapping onto the LELQ.	Findings support that animal assisted therapy may help to improve the quality of life of patients with dementia who are institutionalized. The methodological rigor of the studies were not reviewed.
McCabe, M.W. 2002	Within participants repeated measures design	See how the introduction of a resident dog would affect behavior of residents diagnosed with Alzheimer's dementia	22 residents from a 22-bed special care unit in a Midwestern state urban extended health care facility. Residents with a probable diagnosis of Alzheimer's dementia or related disease.	Statistical significant difference in behavioral problems over 4 weeks (decrease in problems) Medication administration was not changed throughout the study.	Limitations include one setting and small sample size. The implications are that a resident dog could impact behavior of patients with dementia

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Petersen, S. 2017	Randomized block design	Assess how effective an FDA approved robotic pet (PARO) is in treating dementia related symptoms.	61 patients all with mild to moderate dementia from 2 senior living centers	Increase in RAID, CSDD, GDS and Pulse oximetry and decrease in pulse, pain medication and psychoactive medications were decreased.in the treatment group	The PARO robotic pet was shown in this study to decrease stress and anxiety and leads to a reduction in pain and psychoactive medications in patients with dementia
Olsen, C. 2016	Multi-center prospective cluster randomized trial	See the effects on depression, agitation and quality of life for cognitively impaired nursing home residents after 12 weeks with animal assisted therapy	N=51 From 10 adapted units in Norwegian counties. Control group had 26 participants and the intervention group had 25 participants	Although no effects on agitation, the animal assisted, therapy had a significant statistical and clinical improvement on depression and quality of life, especially on those who have severe dementia	Depression and agitation are predicted by severity of dementia. There is a higher prevalence with advanced stages of dementia when controlled for age, gender and psychotropic medications. Unlike other studies, this showed the more advanced stage of dementia resulted in less depressive symptoms – this could have been related to the use of DMAS which is valid in advance stages so could have increased detection compared to other study that may have used a different tool. These findings could mean a high prevalence of untreated agitated depression due to the close relationship shown between depression and agitation. This finding could lead to a different approach to treatment.

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Majic, T. 2012	Cross-sectional prospective cluster cohort guideline implementation study	Performed to investigate relationship between the severity of dementia, age gender, psychotropics and agitation and depression among nursing home residents with dementia	Dementia patients recruited from 18 nursing homes in Berlin, Germany. Total sample size was 304 residents (5-33 per nursing home) with a diagnosis of dementia and who met criteria:	Significant association between age and physically non-aggressive behavior – increase risk for physically non-aggressive behavior up to 95 years old. Starting at age 75, residents are two times more likely to be depressed compared to residents 65-75 years old. Women were significantly more likely to demonstrate verbally agitated behaviors. Gender and depression showed no association. Stages of dementia severity and physically aggressive, physically non-aggressive, verbally agitated and depression showed high associations. Depression associated aggression/agitation	Agitation and depression are prevalent and associated with dementia severity among nursing home residents in Germany. As dementia severity increased so did physically aggressive and non-aggressive behaviors as well as verbally agitated behaviors. Risk for depression increased as dementia severity increased and physically aggressive and verbally agitated behaviors were associated with depressive symptoms even beyond dementia severity.

Lead Author and Year	Design	Purpose	Sample and Setting	Findings	Discussion
Schulman-Marcus, J. 2019	Pilot Study	Assess the feasibility of using robotic pets as a non-pharmacologic behavioral intervention for intensive care unit patients with delirium.	20 patients with delirium in an intensive care unit	Robotic pets were well received and may be a feasible intervention to mitigate behavioral disturbances from patients with delirium in an intensive care unit.	Small sample size in intensive care only. The only robotic pet offered was a cat and some wanted a dog.
Wesenberg, S. 2019	Within-subject design	Investigate if including an animal adds value to psychological interventions for people with dementia.	n=19 from 2 nursing homes in Germany	Longer and more frequent periods of positive emotional and social interaction than the control intervention	Small sample size and the same patients were used for the control and intervention group so there could have been carryover effects.
Rodrigo - Claverol, M. 2020	Two-arm parallel controlled, open-label, nonrandomized cluster clinical trial	Evaluate efficacy of AAT on communication and mobility in an institutionalized geriatric population with cognitive impairment	n=46 from two nursing homes	No statistical significance in results of gait and balance but there was statistical significance with improvements in communication post intervention	Sample size, lack of randomization were limitations however the results support benefits of AAT in improving communication in people with cognitive impairment.
Breacher, DB. 2020	Case study	Describe the effectiveness of a robotic cat to assist in the treatment of patients with terminal restlessness	N=1 Veteran with Alzheimer's in a community living center	Robotic cat was used to minimize terminal restlessness in a dying patient with end-stage Alzheimer's	Use of robotic animals could have a significant positive effect in the care of the elderly and end of life patients, improve quality of life and have a role in terminal restlessness.

Table 2. Chart Review Data

	Age	Sex at birth	Admitting Diagnosis	Medical History	Antipsychotic Medications pre PetPal	Antipsychotic Medicaitons post PetPal	Restraint Use pre PetPal	Restraint Use post PetPal
Patient 1	82	Female	Dementia with behavioral disturbance	Dementia, depression, breast cancer	2 doses of Haldol and one dose of Zyprexa	1 dose of Seroquel	Enclosed bed	Enclosed bed except for a 2-hour period
Patient 2	92	Male	Weakness	Dementia, cerebral atrophy, thalamic stroke, UTI, Anxiety, BPH, osteoperosis, skin ca	1 dose Zyprexa and one dose of Seroquel	1 dose of Seroquel	Sitter	Sitter discontinued within 6 hours of receipt of PetPal
Patinet 3	90	Male	Fall	HTN, tachy-brady syndrome, DM, OSA, dementia	3 doses of Zyprexa and one dose of Rozerem	None	Four siderails and sitter	Enclosed bed
Patinet 4	91	Female	Siezure, UTI	Dementia, CKD III, HTN, Hx TIA, frequent UTIs	Seroquel ordered before PetPal was provided	1 dose Seroquel 1.5 hour after reviewing pet pal.	None	None

Table 3. Analysis of Questions 1-6 of Nurse Survey Results (n=21)

Survey Question	Rate how difficult medication administration was while caring for your dementia patient		Rate how difficult doing activities of daily living (bathing, dressing, eating/feeding) was to complete while caring for you dementia patient		While caring for your dementia patient, rate how difficult it was to keep the patient in the bed or chair until a staff member was with him/her for assistance	
	<i>Pre PetPal</i>	<i>Post PetPal</i>	<i>Pre PetPal</i>	<i>Post PetPal</i>	<i>Pre PetPal</i>	<i>Post PetPal</i>
Mean (SD)	1.62 (0.59)	0.95 (0.5)	1.71 (0.63)	0.86 (0.48)	2.05 (0.67)	0.38 (0.5)
df	20		20		20	
P Value (Sign Test)	0.000 < 0.050		0.000 < 0.050		0.000 < 0.050	

Table 4. Results of Nurse Survey questions 7-8 (n=21)

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Undecided</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
<i>I Felt Less Helpless and More Hopeful once My Patient had a PetPal</i>	9	11	1	1	0
<i>Providing Care was more Manageable once My Patient had a PetPal</i>	6	13	1	1	0

Appendix

Appendix A. Jean Watson's Caring Theory



Appendix B.

Pittsburgh Agitation Scale

Patient Label: _____ Rater's Name: _____

Date: _____ Time: _____ am/pm to _____ am/pm

Hours of Sleep this rating period:

Circle only the highest intensity score for each behavior group that you observed during this rating period. Use the anchor points as a guide to choose a suitable level of severity. (not all anchor points need to be present. Choose the more severe level when in doubt.)

Behavior Groups	Intensity During Rating Period
Aberrant Vocalization (repetitive requests or complaints, nonverbal vocalizations, e.g. – moaning, screaming)	0. Not Present 1. Low volume, not disruptive in milieu, including crying 2. Louder than conversational, mildly disruptive, <u>redirectable</u> 3. Loud, disruptive, difficult to redirect 4. Extremely loud, screaming or yelling, highly disruptive, unable to redirect
Motor Agitation (Pacing, wandering, moving in chair, picking at objects, disrobing, banging on chair, taking others possessions. Rate "intrusiveness by normal social standards, not on effect of other patients in milieu. If "intrusive" or "disruptive" due to noise, rate under "vocalization"	0. Not present 1. Pacing or moving about in chair at normal rate (appears to be seeking comfort, looking for spouse, purposeless movement) 2. Increased rate of movements, mildly intrusive, easily <u>redirectable</u> 3. Rapid movements, moderately intrusive or disruptive, difficult to redirect 4. Increased movements, extremely intrusive or disruptive, not <u>redirectable</u> verbally
Aggressiveness (Score "0" if aggressive <i>only</i> when resisting care)	0. Not present 1. Verbal threats 2. Threatening gestures, no attempt to strike 3. Physical toward property 4. Physical toward self or others
Resisting Care (circle associated activity) Washing Dressing Eating Meds Other _____	0. Not present 1. Procrastination or avoidance 2. Verbal/gesture of refusal 3. Pushing away to avoid task 4. Striking out at caregiver
Were any of the following used during this rating period because of behavior problems? (circle interventions used) Seclusion PRN Meds (specify)	
Restraints Other interventions _____	

Developed by Rosen J, Burgio L, Kollar M, et al. The Pittsburgh Agitation Scale: A user-friendly instrument for rating agitation in dementia patients. Am J Geriatr Psychiatry 1994; 2:52-59.

Appendix C. Nurse Survey and Email Communication with Consent

1. Please rate how difficult **medication administration** was while caring for your dementia patient **PRIOR** to having the PetPal

-

Not difficult	Somewhat Difficult	Very Difficult	Too Difficult to complete Task	N/A - No medications due
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Please rate how difficult doing **activities of daily living (bathing, dressing, eating/feeding)** was to complete while caring for your dementia patient **PRIOR** to having the PetPal:

Not difficult	Somewhat Difficult	Very Difficult	Too Difficult to complete Task	N/A - No Activities of Daily Living Done
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

3. While caring for your dementia patient **PRIOR** to having the PetPal: please rate how difficult it was to **keep the patient in the bed or chair** until a staff member was with him/her for assistance

Not difficult	Somewhat Difficult	Very Difficult	Too Difficult to complete Task	N/A - Patient physically unable to get out of bed
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Please rate how difficult **medication administration** was while caring for your dementia patient **AFTER** receiving the PetPal

Not difficult	Somewhat Difficult	Very Difficult	Too Difficult to complete Task	N/A - No medications due
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Please rate how difficult doing **activities of daily living (bathing, dressing, eating/feeding)** was to complete while caring for your dementia patient **AFTER** receiving the PetPal:

Not difficult	Somewhat Difficult	Very Difficult	Too Difficult to complete Task	N/A - No Activities of Daily Living Performed
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. While caring for your dementia patient **AFTER** receiving the PetPal: please rate how difficult it was to **keep the patient in the bed or chair** until a staff member was with him/her for assistance

Not difficult	Somewhat Difficult	Very Difficult	Too Difficult to complete Task	N/A - Patient physically unable to get out of bed
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Caring for the patient after they recieved the PetPal was more manageable

Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
<input type="radio"/>				

8. Utilization of the PetPal made me feel less helpless and more hopeful while caring for the patient

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
<input type="radio"/>				

Email to staff with survey link:

Good evening! For those of you who do not know me, I am one of the Directors of Patient Care Services. I am completing my Doctorate Program at JMU and I have one last piece of data I need to collect. If you have ever taken care of a patient who has had a petpal (The robotic cat or dog – see picture below) please complete this survey. The responses are all anonymous.



Here is the link (or QR code if you prefer!)

<https://www.surveymonkey.com/r/DJ8BP2G>



Study Title: The Use of Life-Like, Robotic Animals in the Acute Care Setting to Assist in the Care of Patients with Dementia

Primary Investigator: Abby Denby

Contact Information: asdenby1@sentara.com or 434-654-7449 (office) 434-987-1626 (cell)

You are free to refuse to participate in this pilot project or to withdraw your consent and discontinue participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your relationship with the institution(s) involved in this project.

Your completion of this survey implies your consent to participate in this pilot project

Abby Denby, MSN, RN, NE-BC

Director, Patient Care Services

(C2, C3, W2, OBS/Peds, Resource pool,
Outpatient Diabetes Education,
Chaplains, Palliative Care and
Ortho Service Line Leader)

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434-987-1626 (Cell)

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