Animal Assisted Therapy: An Effective Solution for Symptoms of Dementia in Institutionalized Elderly Patients

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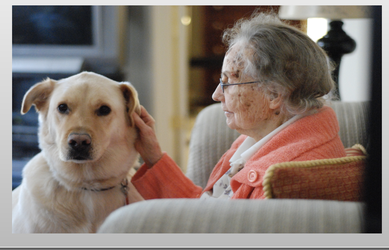

INTRODUCTION

Background

As the ageing population grows, cases of dementia and other cognitive diseases are becoming more prevalent. The Alzheimer's Society of Canada reports an estimated 564,000 Canadians currently living with dementia, with 25,000 new cases diagnosed every year. This number is expected to increase 66% to reach 937,000 cases by 2031.[1] Under these circumstances, it is imperative treatments and interventions are established in managing dementia and its symptoms. Dementia causes impairments in both short and long-term memory, personality, abstract thinking, judgement, language, and recognition.[11] The behavioural and psychological symptoms of dementia (BPSD) include aggression, agitation, pacing and repetitive motor activity, anxiety, depression, psychosis, sleep disturbance, and hoarding.[21] Aggression and agitation are the most common BPSD, which can result in the increased prescription of antipsychotic drugs associated with severe side effects and increased mortality.[2,7] Depression is reported in 30-50% of patients with dementia at all stages of cognitive decline; when left untreated, it can accelerate the course of dementia.[13] There is no cure and limited methods of prevention for dementia, so most interventions are aimed at maintaining function and improving quality of life.[5]

Animal assisted therapy (AAT) is a type of therapy that was introduced in the United States in the 1970s, and is becoming increasingly common among residential aged care facilities. AAT aims to improve social interaction and engagement for patients with dementia.[11,10] AAT commonly involves the interaction between a client and a trained animal as facilitated by a human handler, with the goal of promoting relaxation, social behaviour, and pleasure, and reducing BPSD.[14, 11, 4, 9]

Research Question

What is the Effect of Animal-Assisted Therapy on Symptoms of Dementia in Institutionalized Elderly Patients?

METHODS

Literature Search and Study Selection

The literature search for this study was conducted using Elsevier's Scopus for all studies testing the effects of animal-assisted therapy (AAT). An initial search was conducted using the key phrase "animal-assisted therapy", after which a number of inclusion and exclusion criteria were implemented. Secondary and tertiary search categories, "Alzheimer's" and "nursing home, institutionalized", respectively, were applied to the pool of studies to narrow the results. The remaining search results were then limited to scholarly articles published between 2010 and 2016. Finally, the remaining search results were manually included or excluded as determined by 3 raters. The judges included studies in the final literature review if they: (a) were an AAT study; (b) involved institutionalised participants; (c) involved elderly participants; (d) involved participants with Alzheimer's or dementia; (e) were published in English; and (f) were available for reference thorough the duration of the review. Using this criteria, the raters included 11 studies and excluded 23. The interrater reliability was calculated using Fleiss' Kappa, where k=1, indicating perfect agreement. The study selection process is summarized in Figure 1.

Assessment of Studies and Data Extraction

As shown in Table 1, participant characteristics of participants, features of the intervention (type, delivery, frequency, assessment instruments), primary findings and limitations were determined for the studies.

The quality of the selected articles was rated based on internal and external validity. Points were deducted from a baseline of 10 points per study as follows:

Threats to internal validity:

•presence of biases, confounding or extraneous variables (deduct 0.5 pts per identified threat).
•lack of randomization (-1 pt.)
•sample size (-0.5pts if n=30-100 and -1pt. if n < 30)
•absent inclusion & exclusion criteria (-0.5pts)

Threats to external validity:

•Lack of statistical measures acknowledging differences within sample (age, sex) (-1 pt.)
•unrealistic setting (-1 pt.)

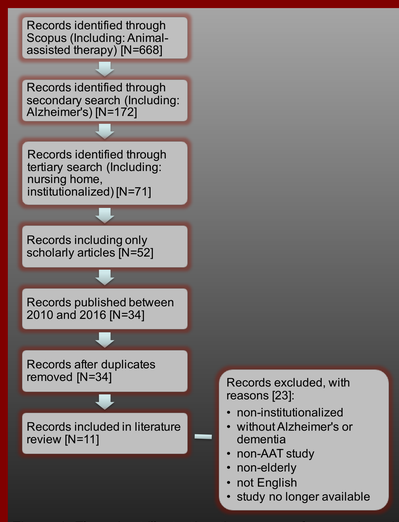

Figure 1: Flow chart illustrating the process for search and selection of studies for the literature review.

RESULTS

Table 1: Summary of characteristics of participants, features of interventions, and primary findings, and quality ratings of studies included in the structured literature review. Legend of terms and abbreviations below.

Study	Characteristic of participants	Features of the intervention	Primary findings	Quality rating
[7] Edwards et al. (2013)	n= 70 **Inclusion**: Diagnosis of dementia, no diagnosis of terminal/end-stage illness; ability to take nutrition orally **Exclusion**: blind	RCT: Prospective observational design **Type of animal:** fish (Aquarium); **Frequency/delivery:** Aquarium in dining area (10 weeks); **Assessment** (variable: food intake and body weight) Measuring (g) all food and fluids (separately) residents consumed/meal by 3 specific trained staff • Food intake = difference (g) between pre meal/post meal • Weighed: 3 months before, during (1x/month), 3 months following end of study	• Significant ↑ in food and beverage intake by AAT group: ° ↑ Beverage and food intake between lunch and supper ° ↑ Solid food intake for breakfast and supper ° ↑ Daily score (total) • Significant ↑ in body weight (n = 2.2 pounds) • 8/70 subjects experienced weight loss	7.5
[8] Edwards et al. (2014)	n= 71 **Inclusion**: diagnosis of dementia, no diagnosis of terminal illness, scored within 0-20 range for MMSE	Pre-test, post-test design **Type of animal:** fish; **Delivery**: aquarium in dining room; **Frequency**: during meal time (3x/day); **Assessment:** (variable- BPSD) adapted version of Nursing Home Disruptive Behavior Scale, day-charge nurse completed the survey instrument.	• Improved overall behavior (uncooperative, irrational, sleep) • decreased annoying behaviors in exposure group, no change in control •Bonferroni post hoc test: no significant differences between facilities	7
[10] Friendmann et al. (2015)	n= 40 **Inclusion**: AL residents, elderly with mild to moderate dementia, MMSE score 8-23 **Exclusion**: residents who moved out, did not consent, unable to communicate, allergies, fear dogs.	RCT (w/ repeated measures) **Type of animal:** Dog (Welsh corgi); **Methods:** coin flip to assign. 1. AAT: ADL, small motor skills, talking to dog, 2. Control (CG): cognitive therapy, no AAT; **Frequency:** Sessions 2x/week for 12 weeks; **Delivery:** 60-90min structured dog visits **Assessment** (assessed prior and post every month): • 7-item AES, CSDD, CMAI, Barthel Index (Physical abilities nurse ratings), Actigraph Activity Monitor (24/7 physical function)	• Physical activity increase over time for AAT group and decrease for controls •Emotional: no significant difference between groups • ↓ depression in AAT group; no change in anti-depressant frequency Behavioral: no significant change for control group • ↓ of BPSD over time for AAT group	8.5
[13] Majic et al. (2013)	N = 75 **Inclusion**: duration of cognitive impairment < 6 months, MMSE score < 25, fit the DSM-IV criteria **Exclusion**: delirium or other relevant Axis I diagnoses, terminal somatic illness	RCT **Type of animal**: dog (border collie); **Methods:** 1. Intervention group: AAT 2. Control group: treatment as usual (TAU); **Frequency/Delivery:** 10 weeks, 1/week, intervention sessions with dog, the guide and resident, 45mins. **Assessment:** 4 weeks pre and post study assessments of depression, agitation and anxiety, psychotic drug prescription · CMAI, DMAS, assessed prior and after study	No significant improvement for either group •↑ in total CMAI and DMAS •↑agitation/aggression symptoms overtime for TAU only •↑ BPSD & slight ↓ agitation, anxiety & caregiver burden in control • Symptoms mostly constant when combining AAT and TAU for patients with severe stages of dementia vs. TAU only •↓ risk for severe symptoms for both groups	8
[14] Marx, M.S (2010)	n= 56 **Inclusion**: diagnosis of dementia **Exclusion**: accompanying diagnoses, full absence of dexterity /inability to sit comfortably, < 60yrs old, MMSE score> 23	**Method**: 1. Puppy video, 2. Dog-coloring activity, 3. Robotic dog, 4. Small dog, Medium, Large dog; **Frequency:** between 9:30-12:30pm and 2-5:30pm; **Delivery:** trials were separated by an interval of at least 5 minutes, each trial last 3 mins, trial cut-off of 15mins. **Assessment:** systematic observation + analytic approach · Participants attitude toward stimulus and duration of engagement · Baseline info gathered through charts & interviews ·MDS (ADL performance), MMSE (cognitive functioning)	• ↑ verbal communication by residents who interacted with real dogs • AAT effective in improving social interaction and engagement	6
[15] Menna (2016)	n = 50 **Inclusion**: those with mild-to moderate Alzheimer's disease and absence of behaviors.	**Type of animal:** Dog (Labrador retriever) **Methods:** 1. AAT: animal-assisted therapy adapted to ROAT protocol, 2. ROT: reality orientation therapy protocol (therapist/patient), 3. Control group **Frequency:** 1x/week over 6-month period; **Delivery:** Introducing the dog (first 15 mins), structured activity with the dog (20mins), closing speech and washing hands (last 10 mins) **Assessment:** mental state (MMSE) and depression levels	•MMSE scores↑ (19.9 at T0 to 20.2 at T1) • Both groups: significant improvement in GDS & MMSE (AAT > ROT) •GDS score ↓ for AAT group T0 to T1 (11.5 to 9.5) • Control group: no difference in GDS and MMSE from T0 to T1	7.5
[16] Morretti et al. (2011)	n = 10 **Inclusion**: institutionalized for min 2 months, diagnosed with mental illness based on ICD **Exclusion**: deaf/blind or unable to interact w/ staff.	**Type of animal:** Dogs (Golden retriever and Pincher) **Method:** 1. Cases: interact with animals 2. Controls: no interaction with animals **Frequency**: over 6 weeks (no other specifications); **Delivery**: interventions, time spent with dogs **Assessment** (mental state, self-perceived quality of life) · assessed MMSE & GDS, self-perceived quality-of-life questionnaire (pre and post intervention)	• AAT improved depressive symptoms in residents by 50% • GDS (mood) improvement before and after pet therapy • GDS no difference in control group • MMSE in cases showed significant improvement (2x control) • ↑ self-perceived quality of life for 5/10 (cases) and 2/11 (control)	6.5
[17] Mossello et al. (2011)	n = 10 **Inclusion**: residents must attend an Alzheimer Day Care Center	Controlled, non-randomized, repeated measures design **Type of animal:** Dog; **Method:** T0 -> Case AAT (T1) Active-control: plush dog (T2); **Frequency/Delivery:** 3x/week, 100mins (10am-12) **Assessment** (3 different raters): Behavioural and psychological assessment at T0, T1, T2 with MMSE. Direct observation of emotional status using OERS. Other tests include: CMAI, NPI, CSDD, ABMI, MoBOF	•↓ CSDD post-therapy •↑ OERS (pleasure) during therapy •↓ in depressive symptoms during therapy •↑ MoBOF No significant change: • in NPI total score and ABMI • CMAI right after AAT but shown ↓ trends	6
[18] Nordgren (2012)	n = 1 · widow, 1 daughter and grandchild, diagnosed with cancer, medical records show dementia diagnosis through CT and MMSE	Single-case pilot study, Pre-test, post-test measures **Type of animal:** Dog (retriever); **Method:** AAT: walking, grooming, feeding, talking; **Frequency:** 60mins session/week, over 8-week period (intervention: after 3month), observation over 5 months; **Delivery:** Dog visitations (same activities each visit) with dog handler (DH) and OT (alternates) **Assessment** (3 different people for data collection): · MMSE, QUALID (in late-stage dementia scale), CMAI, MDDAS	•After AAT showed increase in attention seeking, wandering, cooperation •after 3 months, increase in help-seeking, ability to move, self-perceived quality of life • MMSE (Cognitive and orientation) score ↑ after 3 months • ↓ frequency of symptoms, agitated behaviors after 3 months	4
[19] Nordgren & Engstrom (2014)	n= 9 **Inclusion**: requires OT prescription	Pre-test, post-test design **Type of animal:** Dogs; **Method:** AAI; **Frequency/Delivery:** 10 sessions, 1-2x/week, 45-60min **Assessment** (cognitive, physical, psychosocial) by OT and dog handler using MMSE, QUALID (likert-type scale)	Descriptive statistics show that after AAT •↑ quality of life •↑ joy and well-being	4.5
[20] Nordgren (2014)	n = 33 **Inclusion**: Must fulfill one or more indications for a dog-assigned intervention, not being allergic to dogs, not having expressed anxiety towards dogs	Quasi-experimental longitudinal design, Pre-test, post-test measures **Type of animal:** Dogs (different breeds); **Method:** 1. Intervention group, 2. Control group; **Frequency/Delivery:** 10 sessions, 1-2x/week, 45-60 min **Assessment:** performed by same nurses only compared within groups · assess BPSD performed at baseline, immediately after completion + 6 months later (follow-up) with CMAI, MDDAS by staff based on observations of ADLs behaviors	CMAI (intervention group) •↑ verbal agitation for the DAI group at 6 month follow-up and physical aggressive behaviors •↓ physical non-aggressive behaviors MDDAS •↓ behavioral & psychological symptoms *lower scores indicates fewer symptoms	7.5

AAT: Animal Assisted Therapy; **ADL**: activities of daily living; **AES**: Apathy Evaluation Scale; **ABMI:** Agitated Behaviour Mapping Instrument; **CMAI:** Cohen-Mansfield Agitation Inventory (CMAI); **CSDD**: Cornell Scale for Depression in Dementia; **DMAS:** Depressive Mood Assessment Scale; **GDS**: Geriatric Depression Scale; **MI(D)DAS**: Migraine Disability Assessment; **MDS:** myelodysplastic syndrome; **MoBOF:** Motor Bheaviour Observation Form; **NPI:** Neuropsychiatric Inventory; **QUALID:** quality of life in late-stage dementia

DISCUSSION

Discussion and Future Implications

A temporary decrease in symptoms of dementia among elderly in long-term care units following AAT interventions was reported with periodical exposure to both animals. AAT increased pleasure, alertness, and motivation to initiate and participate in different activities. This increased motor activity due to a greater interest and attraction to the environment. Nine out of eleven studies utilized dogs in AAT, which increased physical activity, reduced depressive symptoms, and improved cooperation and communication between animals, family members, and nursing staff. Such changes reflected an improved self-perceived quality of life as measured through questionnaires and MMSE tests. Dogs are skilled at understanding subtle body language and responding appropriately and can initiate and facilitate interactions. The use of dogs in AAT may also be a cost-effective intervention as many handlers are often willing to volunteer their dogs for AAT. However, some patients may be afraid or allergic, and some care facilities may be resistant due to liability concerns. AAT also improved social interaction and engagement for elderly with dementia through dog-related stimuli (e.g. videos of puppies, robotic dogs, and plush dog toys). The use of aquariums within a dining room environment led to increased nutritional intake and improved overall behaviour, promoting calming effects. Residents are able to observe aquariums at their own leisure; thus, this form of AAT can effectively introduce animals into dementia care units for extended periods of time. AAT had a greater impact on early-stage patients with mild symptoms of dementia than end-stage dementia patients, as severe symptoms including agitation/aggressive behaviours persisted after the interventions. None of the studies showed a significant change in the frequency of antidepressant medication.

Limitations of Studies Reviewed

Many of the studies utilized a small sample size, leading to poor external validity. Some of the sample populations were not randomized, and lacked clear inclusion and exclusion criteria which threatened internal validity. Many studies implemented qualitative measures or had multiple measurers which could cause a variation in findings between subjects. Finally, none of these studies examined effects of AAT intervention throughout the individual's lifetime.

Limitations of Structured Literature Review

One database was consulted while omitting grey literature resulting in database bias limiting the pool of available studies to investigate. Furthermore, only English articles were rated and included in the review (language bias). It is important to note that the quality assessment ratings focused on the rigour of the studies, and thus RCTs were weighted more heavily than other forms of studies such as case controls.

CONCLUSION

The introduction of AAT into dementia care units is an effective and cost-efficient strategy that can be used as an alternative to traditional pharmacological solutions. AAT enriches the environment and quality of life for elderly persons with dementia without dramatically increasing staff workload.

Further research should include RCTs investigating the long-term effects of AAT in larger and more diverse samples, specifically focusing on adoptive AAT and artificial or virtual AAT.