Animal-Assisted Therapy at an Outpatient Pain Management Clinic

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Abstract

Objective. The objective of this study was to evaluate the effects of brief therapy dog visits to an outpatient pain management facility compared with time spent in a waiting room.

Design. The design of this study is open-label.

Setting. This study was conducted in a university tertiary care adult chronic pain outpatient clinic.

Subjects. The subjects of this study include outpatients, adults accompanying outpatients to their appointments, and clinic staff.

Intervention. Participants were able to spend clinic waiting time with a certified therapy dog instead of waiting in the outpatient waiting area. When the therapy dog was not available, individuals remained in the waiting area.

Outcome Measures. Self-reported pain, fatigue, and emotional distress were recorded using 11-point numeric rating scales before and after the therapy dog visit or waiting room time.

Results. Two hundred ninety-five therapy dog visits (235 with patients, 34 family/friends, and 26 staff) and 96 waiting room surveys (83 from patients, 6 family/friends, and 7 staff) were completed over a 2-month study period. Significant improvements were reported for pain, mood, and other measures of distress among patients after the therapy dog visit but not the waiting room control, with clinically meaningful pain relief (decrease ≥2 points) in 23% after the therapy dog visit and 4% in the waiting room control. Significant improvements were likewise seen after therapy dog visits for family/friends and staff.

Conclusions. Therapy dog visits in an outpatient setting can provide significant reduction in pain and emotional distress for chronic pain patients. Therapy dog visits can also significantly improve emotional distress and feelings of well-being in family and friends accompanying patients to appointments and clinic staff.

Key Words. Anxiety; Clinically Meaningful Pain Relief; Depression; Staff; Therapy Dog; Waiting Room

Introduction

Complementary therapy is defined as treatment that supports, facilitates, or enhances conventional treatment strategies. Animal-assisted therapy describes a complementary intervention with animals, usually dogs trained to be obedient, calm, and comforting [1–5]. A literature review evaluating the effects of animal-assisted therapy provided class IIa-IIb evidence (shown to be acceptable and useful) for recommending animal-assisted therapy to optimize healing environments [6]. Published studies evaluating benefits of therapy dog visits suggest that 10–15 minutes provide optimal benefits to those visited by the dog [7], with benefits shown across a broad range of medical conditions (Table 1) [8–14].

A number of studies have evaluated physiological impact from therapy dog interactions, documenting significantly reduced blood pressure and heart rates in both healthy volunteers and medical patients [15,16]. Positive changes in neurophysiological stress markers, such as significant reductions in serum and salivary cortisol, have been demonstrated following therapy dog visits, including visits made to health care providers [17,18]. Blood pressure and serum neurochemical levels in 18 healthy adults were tested before and after a period of quiet reading and before and after a positive dog interaction [17]. Blood

Table 1 Sample of studies evaluating therapeutic dog interventions

Reference	Population	Study Design	Results
Havener et al. 2001 [8]	Children undergoing dental procedures (N = 40)	Random assignment to procedure with or without dog present at the child's side during the procedure. Anxiety response with dental procedure as measured by skin temperature. Increased temperature occurs with relaxation and decreased temperature with anxiety	Significant temperature reduction with dog visit among children reporting fear of dental visits. Among fearful children, change in skin temperature from baseline was +2.2°F while waiting for the dentist and −1.3°F during the procedure with dog present; without the dog, change vs baseline was −1.7°F while waiting and −3.6°F after the procedure
Martin and Farnum 2002 [9]	Children with pervasive developmental disorders (N = 10)	While interacting with a therapist over 15 minutes, children were exposed to three different conditions: nonsocial toy ball, stuffed dog, and therapy dog. Each visit used only one condition which rotated among visits, with children meeting three times weekly for 15 weeks	Children exhibited a more playful mood, were more focused, and were more aware of their social environments when in the presence of a therapy dog. Children were also more likely to talk to the dog, initiating numerous conversations and verbal exchanges
Johnson et al. 2003 [10]	Inpatients receiving nonpalliative cancer treatment (N = 30)	Random assignment to therapy dog visit with handler instructed not to interact with the patient, visit from a friendly volunteer, or quiet time reading magazines	Therapy dog visit ($P < 0.001$) and friendly volunteer ($P = 0.011$) both perceived significantly more positively than quiet time spent reading magazines, with no significant difference between the two types of visits. Reported positive perception and impact of visits consistently highest among participants receiving therapy dog visit
Macauley 2006 [11]	Aphasia due to left hemispheric stroke (N = 3)	Weekly 30-minute speech therapy administered over 12 weeks without therapy dog followed by 12 weeks with therapy dog	Aphasia scores improved an average of 7.5 with traditional therapy and 8.3 with therapy administered with dog present. Participants also reported greater improvement and greater motivation to work in therapy when the dog was present
Chu et al. 2009 [12]	Schizophrenia inpatients (N = 30)	Random assignment to weekly 50-minute therapy dog sessions for 2 months vs usual care control	Self-esteem improved 62% with dog vs 2% worse with control ($P = 0.025$), self-determination improved 59% with dog vs 2% worse with control ($P = 0.020$), positive symptoms reduced 43% with dog vs 4% worse with control ($P = 0.005$), negative symptoms reduced 24% with dog vs 8% worse with control ($P = 0.097$), and emotional symptoms reduced 63% with dog vs 0.9% worse with control ($P = 0.048$)
Mossello et al. 2011 [13]	Alzheimer's dementia in day care (N = 10)	Two weeks baseline, 3 weeks control with stuffed dog, and 3 weeks therapy dog visits. Both control and dog visit activities were conducted with a group of patients with about 10 minutes of patient interaction with the stuffed or real dog three times weekly	No changes occurred after 3 weeks with stuffed dog interaction. Significant improvements occurred after the therapy dog intervention period for anxiety ($P = 0.04$), sadness ($P = 0.002$), and general alertness ($P = 0.003$). Significant improvements also occurred with the therapy dog visits for motor activity ($P = 0.017$) and vocal expression ($P = 0.002$)
Abate et al. 2011 [14]	Chronic heart failure in hospital (N = 69)	Ambulation with a restorative aide was offered with a therapy dog walking with the patient. Compared with historical heart failure population of 537 patients	7% refusal rate with walking offered with therapy dog vs 28% historical refusal rate ($P < 0.0002$). Average distance walked was 235 steps when walking with dog vs 120 steps in historical control without therapy dog ($P < 0.0001$)

pressure was significantly reduced after the dog visit, with changes occurring over a range of 5–24 minutes (average time = 15 minutes). Mean arterial pressure decreased from an average of 87.6 mm Hg before the dog visit to 84.4 mm Hg after the visit ($P < 0.01$). Blood pressure was not reported for quiet reading. Significant neurochemical changes occurred with both therapy dog visits and quiet reading; however, more significant improvements occurred with the dog encounter. Salivary IgA levels were also shown to increase in healthy college students after sitting on a sofa petting a dog ($P < 0.05$), but not after sitting on a sofa petting a similar stuffed dog or quietly sitting on the sofa [19]. More interestingly, pet attitude scale scores among these students did not correlate with the immune response, demonstrating that the physiological response was independent of the individual's attitude toward pets. Longer term physiological changes were demonstrated in a study measuring salivary chromogranin A, a protein produced by the adrenal glands and released when the nervous system is stressed, in seniors with dementia attending adult day care receiving therapy dog visits every other week [20]. Chromogranin A levels were measured at the beginning of the study and after the dog had been visiting for 3 months. Therapy dog sessions were provided at the same time each visit, with chromogranin A measured at fixed times to avoid circadian variability, with comparison values obtained for an analogous group at the day care center not receiving therapy dog visits. After the final visit, chromogranin A levels had dropped by 57% in seniors who visited with the therapy dog, compared with a 19% increase in residents who did not receive visits.

A potential impact from therapy dog visits for reducing pain and distress has been evaluated in several small studies. For example, a therapy dog interaction with 59 medical and surgical hospitalized patients for an average of 10 minutes resulted in an average improvement on an 11-point numerical rating scale (0 = no symptom; 10 = worst symptom imaginable) from 3.2 to 2.5 for pain and from 4.1 to 4.9 for energy ($P = 0.001$ for both). Significant improvements also occurred for anxiety, depression, and anger [21]. In another study, hospitalized children with pain (average age 12) received a 15–20 minute visit from a therapy dog (N = 18; pretreatment pain using an 11-point scale = 4.7) or sat quietly alone for 15 minutes (N = 39; pretreatment pain = 5.2). Pain decreased more significantly after the therapy dog visit (–1.6 vs –0.3, $P = 0.006$) [22]. Another small study (N = 25) showed significant pain reduction using a faces scale when children with acute postoperative pain spent 11–20 minutes with a therapy dog [23]. The effect of animal-assisted therapy in chronic pain was evaluated indirectly in a group of adults with brain or spinal cord injuries, degenerative diseases, or severe physical disabilities in a rehabilitation facility (N = 58) [24]. As needed, analgesic use decreased by 48% after a therapy dog had been added to the facility.

Therapy dogs have also been shown to reduce symptoms for patients waiting for appointments. A pilot study showed an average 33% reduction in anxiety scores in 28 patients spending 15 minutes with a therapy dog prior to a scheduled magnetic resonance imaging (MRI) ($P < 0.001$) compared with essentially no change among six patients waiting for an MRI without the therapy dog [25]. In another study, severely depressed adults waited 15 minutes in a room with a therapy dog or a room with magazines before receiving electroconvulsive shock therapy (N = 35) [26]. Compared with waiting with magazines, fear was significantly reduced ($P = 0.000.6$) and anxiety showed a trend toward significant reduction ($P = 0.098$) with the dog visit.

The current study was designed to evaluate the benefit of including brief complementary therapy during routine office visits to an outpatient pain clinic. Therapy dog visits were selected as the complementary therapy used because they are cost-free to the clinic and require no additional staff time (e.g., explaining to patients how to use relaxation tapes), additional equipment (e.g., CD players for relaxation recordings or music therapy), or additional nonvolunteer personnel (e.g., massage or activity therapists). This study was intended to expand on earlier studies by evaluating symptom change when replacing a typical waiting room experience with a brief therapy dog visit in an outpatient tertiary chronic pain management facility. This study is an exploratory analysis to identify potential benefits to patients, their associates, and staff from spending time with a therapy dog in an outpatient pain management facility. While anecdotal reports describe benefits from therapy dog encounters for staff and patients' visitors [7], non-patient effects have not been previously studied in a systematic way. As managing pain patients is stressful for staff, this study also evaluated the potential stress-relieving benefits for staff members from therapy dog visits.

Methods

This open-label study was conducted in an outpatient, tertiary care, interdisciplinary pain management clinic from June 1, 2011 to July 27, 2011. The study protocol was approved by a local Institutional Review Board as an exempt study not requiring informed consent from participants. The study was conducted as a survey study, which minimized disruption to clinic flow. Prescreening patients or requiring patients to consider participation and randomly assigning interested candidates to therapy dog visits vs the waiting room control would have required a consenting process that would have exceeded the time spent with the typical therapy dog visit. In addition, there was a concern that the consenting process itself would provide information about anticipated potential therapy dog benefits that might have encouraged participants to report more favorable responses than they experienced.

Ideally, therapy dog studies would be conducted using randomized participant assignment to therapy dog intervention vs usual treatment or a comparable treatment control, with outcome measured using non-self-report assessments obtained weeks to months post-intervention

to determine persistent impact [27]. A usual treatment comparison is most readily conducted when using narrow, homogeneous populations receiving similar treatment. A decision was made to use a less rigorous study design with a waiting room control due to the heterogeneous nature of patients seen within this tertiary clinic and for feasibility to avoid disrupting the flow of a busy outpatient practice. In addition, typical treatment used to treat chronic pain in this practice, including self-management strategies (e.g., rehabilitative exercise and cognitive behavioral therapies) and neuromodulating medications (e.g., antiepileptics and antidepressants), are anticipated to produce benefits after weeks to months of treatment initiation and adjustment, making determination of the impact from a therapy dog visit at some point during the course of this usual care difficult. Furthermore, different treatment strategies were employed both within and between pain conditions. In order for therapy dog impact during outpatient treatment to be evaluated as an additive therapy, outpatient treatment would have needed to be standardized, which was beyond the scope of the current study.

Subjects

Study participants were recruited through study advertisements placed in patient waiting areas and on the room occupied by the therapy dog. The advertisement sign for therapy dog visits was approved by the Institutional Review Board and stated: "Therapy Dog Research Project. This research asks how you might spend time before your visit waiting in a room with a therapy dog. Please complete the front page of the research survey before coming in to see the dog." The therapy dog intervention was available two mornings for about 2 hours each week, while the waiting room survey was available when the therapy dog was not present in the clinic.

Adults ≥18 years old were eligible to participate if they were present in the outpatient clinic and interested in participating. Patients, adults accompanying patients to appointments, and staff were eligible to complete surveys about their experience with the therapy dog and/or time spent waiting in a clinic waiting area. Waiting for appointments can be stressful for patients and those accompanying them to appointments [28] Anecdotally, staff members and visitors report positive effects from brief visits with therapy dogs in nursing home and hospital settings. This study chose to additionally log effects in staff and clinic visitors who also opted to interact with therapy dogs as an exploratory analysis.

Survey

Participants completed a screening survey immediately prior to the intervention. The one-page survey asked for demographic information and included the 4-question Patient Health Questionnaire (PHQ-4), a standardized, ultra-brief mood disorder screening tool [29]. The PHQ-4 yields a total score (possible range 0–12), PHQ-2 score for depression (possible range 0–6), and Generalized Anxiety Disorder (GAD-2) for anxiety (possible range 0–6). Recommended score cutoffs ≥3 were used to identify depression and anxiety on the PHQ-2 and GAD-2, respectively. These measures have been validated in a general population sample, with representative normative values reported as 1.76 ± 2.06 for the PHQ-4, 0.94 ± 1.20 for the PHQ-2, and 0.82 ± 1.10 for the GAD-2 [30]. Subjects were also asked to rate current symptom severity on an 11-point scale for 10 factors: pain, fatigue, stress level, aggravation, anxiety or worry, sadness or depression, irritability or frustration, calmness, pleasantness, and cheerfulness. Numeric pain ratings of 5 or higher correlate with substantial pain-related interference and disability [31]. Following completion of the form, participants noted the time on their surveys and began either the therapy dog or waiting room control intervention.

Participants were permitted to complete only one survey on any given day. Additional surveys could be completed on other days, with a notation made on the survey if the person had previously completed a survey.

Therapy Dog Intervention

A certified therapy dog (5-year-old, 40-lb, soft-coated wheaten terrier named Wheatie) and his handler were available to meet in a designated room. Wheatie and his handler are certified as a therapy dog-handler team through Therapy Dogs International. Wheatie and his handler have been making regular therapy visits for 4 years and had completed over 175 visits at the time of this study. Wheatie had also been awarded the American Kennel Club Therapy Dog title. A previous nursing study including three therapy dogs (11 lb miniature schnauzer, 35 lb schnauzer, and 44 lb standard poodle) reported visit perception and duration were influenced by dog size/breed [32]. A single therapy dog was used in this study for feasibility and to avoid introducing an additional confounding variable that might have required additional analyses. Several previously published studies evaluating impact from therapy dog visits on pain variables likewise have used a single therapy dog [22–24].

When participants entered the room, they were introduced to the dog and provided with a chair. The dog was trained to stand or sit next to the chair for the duration of the participant's visit and accept handling. More than one participant could interact with the dog at the same time. Conversations between participants and the dog's handler focused on the dog (breed, age, training, etc.) and dog-related topics. Discussion of health issues with the handler was discouraged. Participants were informed that they could spend as much time with the dog as they preferred or, for patients and their associates, until the patient was notified by the nurse that their appointment was ready to begin. A variable time for the therapy dog visit was used for this study to accommodate clinic flow so that patients would not be detained from appointments

once their clinician was available. Also, this permitted participants an opportunity to choose how much time they preferred to spend, as would be consistent with typical therapy dog visits.

Prior to exiting the room, participants again rated their current symptoms on an 11-point scale. Participants were also asked to rate their satisfaction with the therapy dog interaction by reacting to statements that they enjoyed the visit, that the dog made them happy, and that they would like to visit the dog again on a 5-point scale from strongly disagree to strongly agree. Duration between completing the pre- and post-intervention surveys was noted. In addition, statements verbalized during the therapy dog encounter were recorded.

After completing the therapy dog intervention, individuals were permitted to return to spend more time with the dog that same day; however, no additional data were collected from that day so that no participant could complete more than one survey per day.

Waiting Room Control

After completing the one-page survey, participants were asked to wait for 15 minutes with no particular directions about what to do while waiting. Magazines and a television were available for patients and their associates to use during this time. After 15 minutes, the participants completed a second survey rating current symptoms on an 11-point scale.

Several staff members spent quiet time in the room normally used by the therapy dog on days the dog was absent from the clinic and completed the waiting room control forms during this time.

Data Analysis

This study was designed to be conducted over a 2-month period, with an anticipated sample of 250 therapy dog visits and 50 waiting room controls. Demographics, PHQ-4 results, and satisfaction questions were evaluated using descriptive statistics. Separate analyses were performed for the three groups included in this study: patients, family and friends accompanying patients to their appointments, and clinic staff. Changes in mean pre- and post-intervention symptom scores were calculated and differences were evaluated with paired t-tests, with significance set at <0.05. Statistics were reported for each group, understanding that their usefulness would be limited in groups with smaller sample sizes. In addition, the number of individuals achieving what is considered a clinically meaningful reduction in pain (2 points) [33–35] was determined. In patients with chronic musculoskeletal pain, a reduction of 1 on the numeric rating scale has been linked to a minimal clinically important difference, while a decrease of 2 is associated with "much better" improvement [36]. Finally, the number of participants scoring ≥8 for calm, pleasant, or cheerful pre- and post-intervention was noted.

Analyses were also performed to determine if gender, depression, anxiety, or visit duration (<5, 5–10, or >10 minutes) influenced outcome by performing paired t-tests on change in numeric rating scale measures for the entire sample. Due to the anticipated smaller sample size for family/friends and staff groups, these analyses were not performed separately for the three study samples.

Results

Subjects

A total of 382 individuals participated in this study, with 286 meeting with the therapy dog and 96 completing the waiting room survey (Table 2). Significant between-group differences in demographics included gender for patients ($P = 0.001$) and family/friends ($P = 0.034$) and GAD-2 for patients ($P = 0.037$). Nine individuals (five patients and four staff) met with the therapy dog on two different days, completing two therapy dog assessment surveys. No subject completed more than two surveys. There were a total of 391 visits (295 for the therapy dog and 96 waiting room). Among the therapy dog visits, 235 visits were made by patients, 34 family or friends accompanying patients to appointments, and 26 clinic staff. Among the 96 waiting room surveys, 83 were completed by patients, 6 by family or friends accompanying patients, and 7 by staff. Staff visiting the therapy dog were physical/occupational therapists (N = 8), physicians (N = 5), secretarial staff (N = 3), nurses (N = 2), medical assistants (N = 2), clinic director (N = 1), and project coordinator (N = 1). Job titles for staff completing the waiting room survey were not specified for five participants and two were physical therapists.

Mean visit duration (range) with the therapy dog was 11.1 ± 7.4 minutes (1–45 minutes) for patients, 10.2 ± 5.6 minutes (1–25 minutes) for family and friends, and 8.2 ± 5.1 minutes (1–25 minutes) for staff. The time for the waiting room survey between pre- and post-survey completion was 16.4 ± 6.5 minutes (5–40 minutes) for patients, 13.3 ± 5.2 minutes (5–20 minutes) for family and friends, and 19.7 ± 6.0 minutes (14–30 minutes) for staff.

A number of subjects returned to the therapy dog room after completing their clinical appointments to spend additional time with the therapy dog. Subjects were permitted to spend as much time with the dog as they preferred; however, no additional surveys were completed or data recorded for visits when >1 visit occurred on the same day.

Therapy Dog Visit vs Waiting Room

Pre- and post-intervention data showed significant improvements in all numeric scales for patients and family/friends accompanying patients to their appointments (Table 3). Improvements were seen in all scales except for pain for staff; however, baseline pain severity was already quite low in this group. Changes in mean scores for

Table 2 Participant characteristics

Characteristic	Therapy Dog Visitors N = 286			Waiting Room Control N = 96		
	Patient N = 230	Friends/Family N = 34	Staff N = 22	Patient N = 83	Friends/Family N = 6	Staff N = 7
Age, mean years (SD)	51.3 (12.3)	45.8 (14.2)	39.8 (11.2)	53.9 (13.1)	52.5 (17.9)	31.9 (11.3)
Gender, N (%)						
Male	104 (45.2)	8 (23.5)	7 (31.8)	20 (24.1)	4 (66.6)	1 (14.3)
Female	126 (54.8)	26 (76.5)	15 (68.2)	63 (75.9)	2 (33.3)	6 (85.7)
PHQ-4, mean (SD)	3.96 (3.52)	2.00 (2.74)	1.36 (1.87)	3.48 (2.96)	3.67 (3.27)	2.00 (1.16)
PHQ-2						
Mean (SD)	1.73 (1.82)	0.76 (1.26)	0.27 (0.60)	1.77 (1.67)	1.83 (1.72)	0.86 (0.90)
Depressed, N (%)*	63 (27.4)	3 (8.8)	0	22 (26.5)	2 (33.3)	0
GAD-2						
Mean (SD)	2.23 (2.07)	1.24 (1.81)	1.08 (1.32)	1.71 (1.72)	1.83 (1.60)	1.14 (0.69)
Anxious, N (%)*	92 (40.0)	5 (14.7)	2 (9.1%)	23 (27.7)	3 (50.0)	0
Patient diagnoses, N (%)		NA	NA		NA	NA
Back pain	69 (30.0)			15 (18.1)		
Fibromyalgia	32 (13.9)			15 (18.1)		
Neck pain	18 (7.8)			7 (8.4)		
Neuropathic pain	17 (7.4)			9 (10.8)		
Arthritis	16 (7.0)			4 (4.8)		
Lower extremity pain	14 (6.1)			4 (4.8)		
Headache/migraine	9 (3.9)			5 (6.0)		
Other/unspecified pain	55 (23.9)			24 (28.9)		

* Patients scoring ≥3.
GAD = Generalized Anxiety Disorder; NA = not applicable; PHQ = Patient Health Questionnaire; SD = standard deviation.

patients completing the waiting room survey were numerically small and not significant. Overall, patient symptoms did not worsen or improve when spending time in the usual waiting area. While there were no reported significant changes in family/friends or staff in the waiting room, lack of significance is likely to be influenced by the small sample size. Numerical changes, however, in both family/friends and staff appeared to favor more substantial overall improvements with the therapy dog visits.

Clinically meaningful pain relief was achieved by 22.6% of patients visiting with the therapy dog vs 3.6% completing the waiting room survey. Most of the patients had a pre-intervention pain consistent with substantial impact and interference before the therapy dog visit, using a cutoff of ≥5 [31] (N = 191 visiting the therapy dog and 59 in the waiting room). Among those patients with pre-intervention pain ≥5, clinically meaningful pain relief occurred for 26.2% visiting the therapy dog and 3.4% in the waiting room control.

Mean baseline pain level was low for both family/friends and staff. The pre-pain assessment for family/friends was >2 for 13 participants who would see the therapy dog and 2 individuals in the waiting room control. Seven of the 13 therapy dog participants and one of the two waiting room participants with baseline pain >2 experienced a pain reduction ≥2. Post-intervention pain reductions ≥2 occurred in two of the seven family/friends with pre-intervention pain ≥5 after the therapy dog visit and one of the two waiting room individuals with pre-intervention pain ≥5. Among the staff, one person reported pain >2 before seeing the therapy dog, pain changing from 6 to 5 after the therapy dog visit. None of the staff completing the waiting room survey had pre-intervention pain >2.

Changes in positive feelings are shown in Figure 1. In general, having high self-perceptions of calm, pleasantness, and cheerfulness increased in all groups after meeting with the therapy dog, without substantial changes in most cases when completing the waiting room survey. While pre-intervention percentages reporting high levels of positive feelings were generally similar for patients and staff planning to visit the therapy dog and those completing the waiting room survey, levels were numerically lower among waiting room participants compared with those planning on the therapy dog visit among the family/friends participants.

Subgroup Analyses

Nine individuals visited the therapy dog twice during this study. Excluding data from this second visit from analyses did not affect any outcome.

Table 3 Pre- and post-intervention values (standard error)

Symptom	Therapy Dog Visits			Waiting Room Controls		
	Pre	Post	*P* value*	Pre	Post	*P* value*
Patients						
Pain	6.66 (0.15)	5.74 (0.17)	<0.0001	6.31 (0.26)	6.39 (0.27)	0.516
Fatigue	4.76 (0.20)	3.64 (0.19)	<0.0001	4.76 (0.31)	4.80 (0.31)	0.785
Stress	4.59 (0.20)	2.55 (0.16)	<0.0001	4.01 (0.32)	3.87 (0.33)	0.237
Aggravation	3.24 (0.20)	1.66 (0.15)	<0.0001	2.73 (0.36)	2.81 (0.35)	0.570
Anxiety	3.92 (0.21)	2.14 (0.16)	<0.0001	3.55 (0.35)	3.33 (0.34)	0.125
Sadness	3.12 (0.20)	1.80 (0.15)	<0.0001	3.02 (0.31)	3.00 (0.31)	0.847
Irritability	3.46 (0.20)	1.63 (0.14)	<0.0001	3.08 (0.35)	3.18 (0.36)	0.508
Calm	5.10 (0.21)	7.48 (0.18)	<0.0001	5.22 (0.32)	4.92 (0.35)	0.108
Pleasant	5.69 (0.21)	7.87 (0.17)	<0.0001	5.86 (0.33)	5.61 (0.34)	0.072
Cheerful	5.37 (0.21)	7.83 (0.17)	<0.0001	5.33 (0.34)	5.20 (0.36)	0.348
Family members and friends						
Pain	2.09 (0.45)	1.53 (0.44)	0.011	2.50 (1.59)	1.83 (1.17)	0.235
Fatigue	1.97 (0.41)	1.32 (0.34)	0.006	3.00 (1.41)	1.83 (0.980)	0.315
Stress	2.65 (0.45)	1.12 (0.32)	<0.0001	3.17 (1.22)	4.33 (1.67)	0.302
Aggravation	1.91 (0.46)	0.97 (0.36)	0.004	2.17 (1.14)	2.50 (1.46)	0.854
Anxiety	2.38 (0.52)	1.18 (0.43)	0.001	4.50 (1.54)	1.67 (0.83)	0.137
Sadness	1.59 (0.44)	0.76 (0.33)	0.012	3.83 (1.66)	1.50 (0.96)	0.175
Irritability	1.97 (0.52)	1.09 (0.40)	0.026	3.50 (1.29)	3.00 (1.44)	0.759
Calm	6.44 (0.55)	8.26 (0.40)	0.001	3.50 (1.54)	4.33 (1.87)	0.317
Pleasant	7.18 (0.49)	8.71 (0.33)	<0.0001	5.17 (1.68)	4.50 (1.77)	0.724
Cheerful	7.29 (0.43)	8.56 (0.35)	0.002	4.50 (1.34)	4.17 (1.70)	0.809
Staff						
Pain	0.65 (0.27)	0.50 (0.23)	0.103	0	0	Not applicable
Fatigue	1.88 (0.37)	1.12 (0.35)	0.004	2.29 (0.92)	2.43 (0.97)	0.356
Stress	2.50 (0.41)	0.46 (0.18)	<0.0001	4.14 (1.26)	3.14 (0.91)	0.216
Aggravation	1.58 (0.40)	0.27 (0.16)	0.001	1.71 (0.68)	1.43 (0.65)	0.356
Anxiety	1.81 (0.46)	0.65 (0.2.5)	0.003	2.43 (0.78)	2.29 (0.68)	0.829
Sadness	0.77 (0.29)	0.35 (0.17)	0.009	1.57 (1.11)	1.29 (0.84)	0.356
Irritability	1.50 (0.36)	0.35 (0.15)	0.001	2.86 (0.99)	1.29 (0.57)	0.221
Calm	7.00 (0.56)	8.38 (0.47)	0.001	6.71 (0.81)	7.29 (0.87)	0.0172
Pleasant	7.65 (0.40)	9.12 (0.19)	<0.0001	6.14 (1.10)	6.71 (1.06)	0.172
Cheerful	7.88 (0.35)	9.12 (0.19)	0.001	5.86 (1.26)	6.29 (1.29)	0.200

Each item was scored from 0 (symptom is absent) to 10 (symptom is extreme).
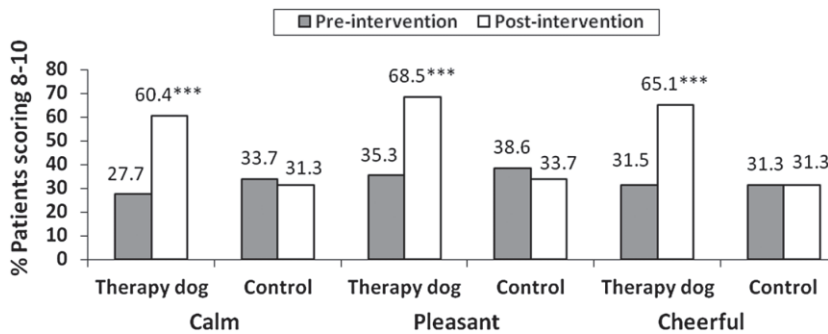* Significance of pre- to post-intervention change.

Therapy dog visits were made by 123 male and 172 female participants, with waiting room surveys were completed by 25 males and 71 females. Significant changes were reported in all measures for both male and female participants visiting the therapy dog, with no significant changes noted among either males or females in the waiting room control. Clinically meaningful pain relief occurred to 18.7% of males and 21.5% of females visiting the therapy dog and none of the males and 5.6% of the females in the waiting room control.

For the therapy dog visits, 68 participants were diagnosed as depressed according to the PHQ-2, with 227 nondepressed; 24 participants completing the waiting room survey were depressed and 72 nondepressed. Among individuals visiting the therapy dog, significant changes

occurred in all numeric ratings for both depressed and nondepressed patients. None of the changes was significant for the waiting room controls, with the exception of anxiety in nondepressed individuals (N = 72), which decreased from 2.85 (standard error [SE] 0.35) to 2.36 (SE 0.30), *P* = 0.028. The change in depressed individuals (5.58 [SE 0.57] to 5.50 [SE 0.59]) was not significant. A clinically meaningful reduction in pain occurred for 25.0% of depressed individuals and 18.9% of nondepressed individuals meeting with the therapy dog compared with 4.2% of depressed and 4.2% of nondepressed individuals completing the waiting room survey.

Among therapy dog visits, 101 were made by individuals diagnosed as anxious using the GAD-2 and 194 non-anxious; waiting room surveys were completed by 26
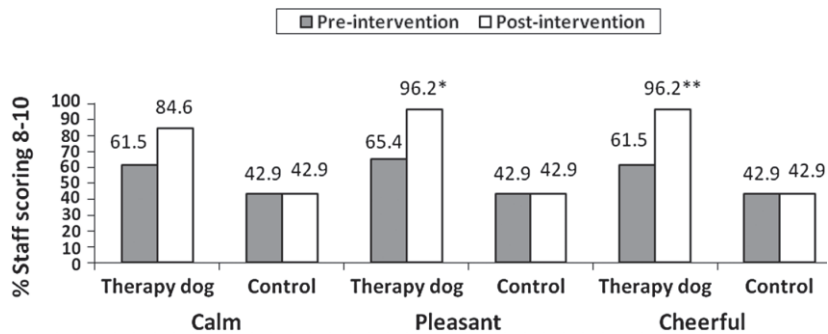
A. Patients (N=235 therapy dog and 83 waiting room control)

B. Family members and friends (N=34 therapy dog and 6 waiting room control)
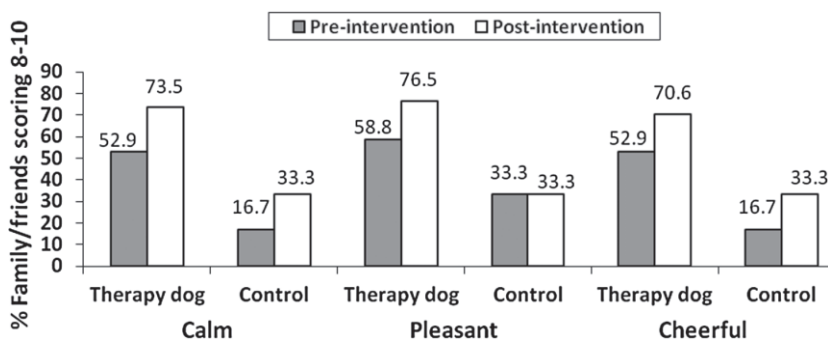
C. Staff (N=26 therapy dog and 7 waiting room)

Figure 1 Calm, pleasant, and cheerful feelings (identified when scoring item ≥8). Significant pre- to post-intervention changes: *$P = 0.014$, **$P = 0.007$, ***$P < 0.0001$.

anxious and 70 non-anxious individuals. Changes in all numeric rating scales were significant for anxious and non-anxious individuals, with no significant changes in either group completing the waiting room survey. Clinically meaningful pain relief occurred in 22.8% of anxious and 19.1% of non-anxious individuals meeting with the therapy dog and 7.7% of anxious and 2.9% of non-anxious individuals in the waiting room control.

A total of 70 individuals spent <5 minutes with the therapy dog, 96 spent 5–10 minutes, and129 spent ≥10 minutes. Improvements in all numeric rating scales were significant for each duration group. Among the waiting room controls, 2 spent <5 minutes completing the survey, 10 spent 5–10 minutes, and 84 spent >10 minutes. None of the

changes after completing the waiting room survey was significant for any numeric rating in any of the duration groups. Clinically meaningful pain relief occurred for 22.9% of participants visiting the therapy dog for <5 minutes, 12.5% visiting 5–10 minutes, and 24.8% visiting >10 minutes. None of the 12 individuals spending ≤10 minutes completing the waiting room survey reported relief; 4.8% spending >10 minutes reported meaningful pain relief.

Satisfaction

The vast majority of participants in each group meeting with the therapy dog had a positive impression of the visit

Table 4 Consistent themes verbalized by therapy dog participants

Comment	Examples
Time with the dog reduces discomfort.	• Spending time with the dog helps bring me back to center and away from my stress. • When I was in the waiting room, I was having the most horrible morning and was so stressed. As soon as I saw the dog, I just beamed and felt my stress melt away. • The dog seems to know right where my worst pain is and goes right to it. After having him by the pain, it seems to get much better. • Spending time with the dog gives me important time to relax rather than worrying about what the doctor might say that I'd be thinking about in the waiting room.
Time with the dog is relaxing.	• I was feeling anxious in the waiting room and the dog calmed me. • Wheatie's attitude is so soothing. He changes your perspective. • Wheatie takes my anxiety away. • Petting the dog gets rid of my stress.
The dog provides a positive distraction from symptoms.	• The dog is a great diversion that keeps me from thinking about my pain; Wheatie takes your mind off your pain. • The dog gives you something else to think about besides your pain. • Wheatie's the best treatment. He helps you let go of all the bad stuff. • The dog is like a sanctuary to me. • The dog helps me forget my misery. • The dog helps me forget my pain.
Patient comments about overall impression	• Wheatie needs to be here for every appointment. • I'd rather see the dog than the doctor. • If I could see Wheatie every day, I wouldn't need to see the doctor. • Time with the dog was the best part of my visit. • I never thought meeting a stranger's dog would help me so. • I'm a "cat person," so I'm surprised how helpful it is petting a dog.
Staff comments about overall impression	• Wheatie needs to be at the clinic all day, every day. • The day is lighter when Wheatie's here.

and endorsed a desire to have future therapy dog visits (Figure 2).

Spontaneous comments made by participants during and after therapy dog visits were overwhelmingly positive. Negative comments tended to focus on a preference for a cat or a general dislike of dogs, although usually individuals reporting a negative pre-visit impression of dogs reported a positive post-visit impression. Comments could generally be categorized into three themes: comfort, relaxation/calm, and distraction. Comments that were repeatedly and consistently heard are summarized in Table 4.

Discussion

This is the first study the authors are aware of evaluating the effects of therapy dog visits in a relatively large study sample that also includes a non-intervention comparison group. Similar to previously published small studies reporting benefits for pain and mood from therapy dog visits, this study confirms benefits for a wide range of symptoms in a relatively large sample of mixed chronic pain patients. Among this group of patients receiving management at a tertiary pain clinic, pre-intervention mean pain exceeded 5, suggesting substantial pain-related inference and disability [31]. Overall, pain severity was significantly reduced after a brief therapy dog visit, with 23% of patients reporting clinically meaningful pain relief. Among those patients with pre-intervention pain ≥5, 26% experienced clinically meaningful pain relief with the therapy dog visit compared with 3% in the waiting room control. Improvements in mood, stress, and other affective variables were also significant. Effects did not appear to be substantially influenced by gender, co-existing mood disorder, or visit duration.

These data support that including complementary treatment, such as therapy dog visits, in a chronic pain waiting room might at least temporarily reduce symptoms of distress and pain in some patients. Although only a minority of patients reported clinically meaningful pain relief after spending time with the therapy dog, therapy dog visits are not intended to be used as a primary pain management therapy. Any potential additive benefit to usual care was not evaluated in the current study because patients in this study were participating in a range of visit types and treatment interventions, with few visits involving a direct treatment intervention during the visits. The effect of the therapy dog visit on subsequent interventions/appointments for each patient was beyond the scope of this study; however, this would be an interesting question to be addressed by future studies using a more homogeneous population receiving similar interventions at visits.
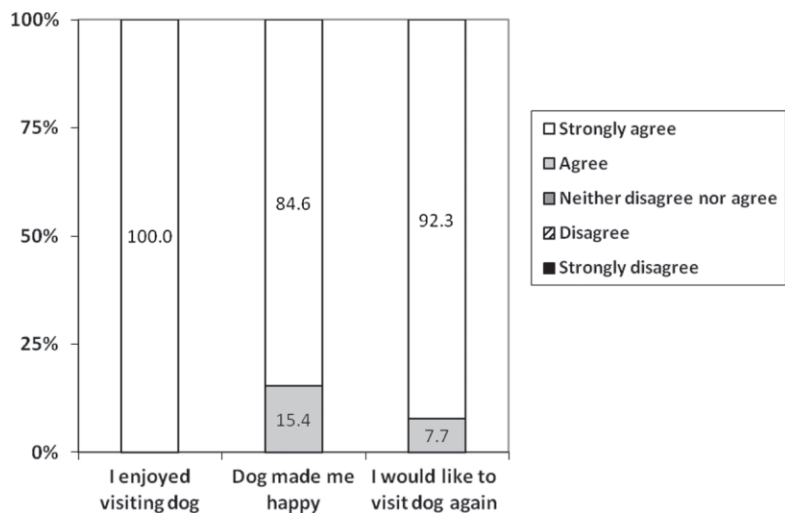
A. Patients
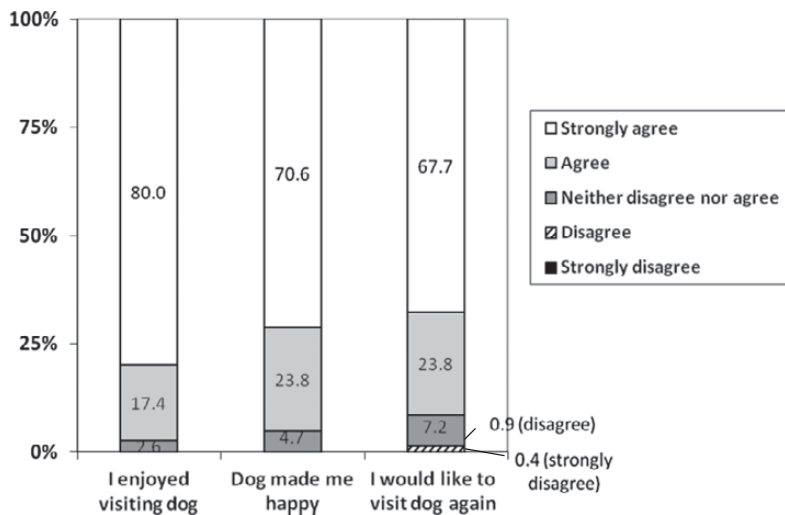
B. Family and friends
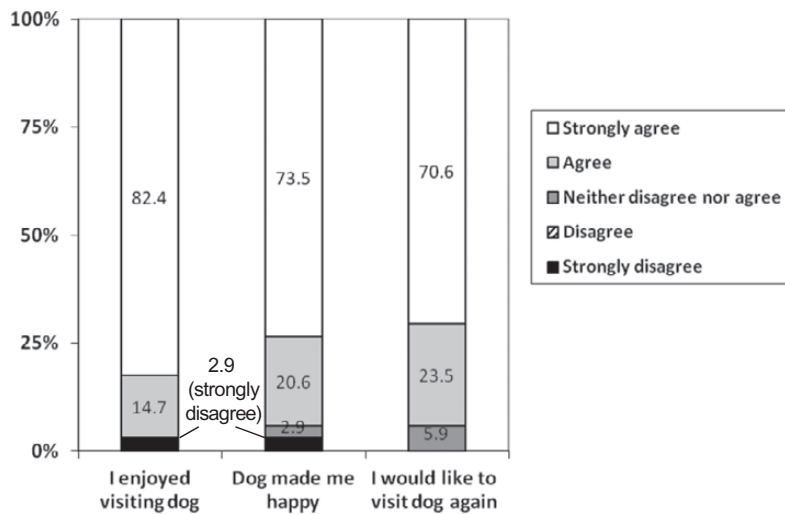
C. Staff

Figure 2 Satisfaction with therapy dog visit.

While the number of family/friends and staff participating in this study was relatively small, this is the first study that the authors are aware of that directly measured perceived therapy dog impact on non-patients who typically also interact with a therapy dog. These sample sizes were limited by the frequency of adults accompanying patients to appointments and the size of the staff within the outpatient clinic evaluated. Despite the smaller samples, significant improvements were noted for therapy dog visits for family/friends and staff. Therapy dog encounters offer a potentially feasible complementary treatment for busy staff, who might have insufficient time to have a break from work to participate in other complementary therapies. In an earlier study, salivary cortisol measured over 60 minutes showed similar significant reductions among staff spending 5 minutes with a therapy dog vs 20 minutes of quiet rest [18]. The ability of staff to spend a few minutes petting a therapy dog between patient duties may be more feasible in a busy office than scheduling longer periods for quiet rest or other complementary therapies.

This study is limited by the design that permitted participant self-selection for participating in either the therapy dog or waiting room aspects of the study. Because participants opted to participate, they may not be representative of the entire clinic population. Individuals choosing to meet with the therapy dog were also likely to be individuals with an overall more positive impression of pets who may have been more likely to benefit. Inability to blind participants to intervention may have also inadvertently encouraged participants to respond more favorably to questions about the therapy dog visit. On the other hand, the nature of therapy dog visits is to provide visits only to individuals who are interested in and agreeable to those visits; so allowing patients to choose to participate or not more closely resembles typical therapy dog encounters. In addition, although the handler involved in this study is experienced making therapy dog visits, independent evaluation of the handler's interactions with the subjects was not included in this study to verify that conversations were maintained according to the approved focus areas established in the study protocol. This study is also limited by utilization of a single therapy dog, which might have been perceived more or less favorably by different participants. Future studies using more than one dog [27] and dogs of different breeds and sizes would help add credibility to this intervention. Furthermore, completing post-visit assessments in the therapy dog room may have influenced results; future studies may wish to ask subjects to complete a post-visit evaluation after exiting the therapy dog room. Interpretations from this study are also limited by the relatively small sample sizes for family/friends and staff groups, especially those completing the waiting room survey. While these samples are consistent with most reported data on therapy dog effectiveness in patient groups, the relatively small numbers limits the usefulness of statistical analyses. Moreover, this study only measured immediate benefits from therapy dog visits. Previous small studies have shown enduring effects in nursing home residents receiving weekly therapy dog visits for decreasing loneliness (N = 45) [37] and twice monthly therapy dog visits for improving mental functions (N = 10) [38]. Data are not available to determine whether benefits from the therapy dog interaction in the current study persisted. Future studies might also wish to compare long-term outcome in outpatients receiving repeated therapy dog visits or other complementary therapy in addition to their usual pain management care. Finally, additive benefits to usual care treatment could not be assessed in this study as patients were seen in the clinic for a range of appointment types (initial consultation, physician follow-up visits, and physical therapy or psychological treatment), with most visits scheduled to assess effects and make adjustments to therapies used by the patient outside of the facility (e.g., medications, rehabilitation exercises, stress management, etc.).

Although this study supports therapy dog visits as a potentially useful complementary treatment in an outpatient tertiary pain clinic, it does not offer a comparison to benefits that might be achieved through other complementary therapies. Anxiety was measured in a previous sample of hospitalized psychiatric patients before and after a 30-minute group complementary therapy intervention with a therapy dog or recreation therapy [39]. Among patients with primary mood disorders, similarly significant improvements in anxiety occurred after both interventions ($P = 0.001$). Anxiety reduction, however, was only significant after the therapy dog intervention for patients with psychotic disorders or other psychiatric conditions, without significant benefit from recreation therapy. This study supported that, for hospitalized psychiatric patients, a therapy dog intervention was at least as effective for reducing anxiety as recreation therapy. A similar design might be applied to future therapy dog studies. For feasibility reasons, a comparison was not made to alternative complementary therapy in the current study.

Conclusions

Therapy dog visits may be a worthwhile complementary addition to outpatient pain management clinics, with benefits expected for patients, individuals accompanying patients to appointments, and staff. This study is unique because of the relatively substantial patient sample evaluated and the inclusion of non-patients for evaluation.

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