

Impact of Dog-Assisted Therapy for Institutionalized Patients With Dementia: A Controlled Clinical Trial

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ABSTRACT

Context • Animal-assisted interventions have been used in recent years to complement other therapies of various types for dementia patients.

Objective • The study intended to evaluate the benefits of dog-assisted interventions for the emotional, behavioral, cognitive, and functional areas of the lives of dementia patients.

Design • The research team designed an experimental study that used dog-assisted therapy (DAT) as the intervention.

Setting • The study was conducted at the Enoc Center, a nursing home, in Azucaica, Toledo, Spain.

Participants • Participants were 21 residents who had been living at the center for more than one year, were over 65 years old, and had symptoms associated with dementia or affective disorders.

Intervention • Participants were randomly divided into three groups: the control, intervention, and healthy groups. The intervention and healthy groups attended the DAT in addition to the center's regular therapies. The

control group didn't attend the DAT but did attend the center's regular therapies. The program occurred over six months, with weekly sessions of 45 minutes in both cases.

Outcome Measures • Participants were evaluated at baseline and postintervention using specific scales appropriate to an area: (1) cognitive—Mini-Mental Status Examination (MMSE), (2) functional—Modified Barthel Index, (3) affective—Yesavage Geriatric Depression Scale: Short Form and (4) behavioral—Neuropsychiatric Inventory Scale (NPI).

Results • The study revealed significant differences between the control group and the intervention group and between the control group and the healthy group in the cognitive, affective, and behavioral areas but not in the functional area.

Conclusions • The program was beneficial for elderly institutionalized patients with dementia in the emotional, behavioral, and cognitive areas. (*Altern Ther Health Med.* 2022;28(1):26-31).

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According to the Spanish National Institute of Statistics [INE], Spain has a population of 46 658 447 persons, of whom 19.1% are over 65 years old, 8 908 151 persons, and 3.4% are estimated to be institutionalized in residential centers in

Spain.¹ According to the Institute of Social Services and the Elderly [IMSERSO], institutionalization brings with it a series of changes, in addition to the loss of independence that these individuals have already experienced prior to moving into a residential center.²

IMSERSO indicates that the decision to move into such centers occurs for a variety of reasons, including medical requirements, the need for specialized care, help with the activities of daily living (ADLs), and the need for an adapted living space. For the institutionalized individuals, it also means accepting a new life situation, with imposed norms and loss of control and responsibilities; residing with other people; and living with illness.

Dementia is the primary cause of older persons being institutionalized. In the first year following diagnosis, the rate of institutionalization is 20%; thereafter the rate increases progressively until reaching 90% at eight years

after diagnosis. In recent years, different types of interventions have been introduced in such centers for the purpose of improving care for institutionalized elderly persons, an example being dog-assisted therapy (DAT).³

The beneficial effects of contact with animals for human health have been the object of study since the mid-twentieth century.⁴ Today, animals may be included in therapeutic, educational, or social programs with diverse aims. DAT includes goal-oriented and structured interventions that deliberately include dogs for the purposes of health, education, and human service, are intended to provide therapeutic benefits and enhanced health and well-being; these are run by health and human-service providers as part of their professional activity.⁵

In recent years, much research has been carried out on the effectiveness of DAT for institutionalized elderly persons. This research has demonstrated benefits in different areas, such as improvement in the behavioral and psychological symptoms of dementia (BPSD). Two types of symptoms exist in dementia: (1) psychological, involving the affective area, such as depression, anxiety, and apathy and (2) behavioral, such as aggressiveness, hyperactivity, or disinhibition.⁶

Some studies have also found improved social skills⁷; slight improvements in the cognitive area⁸; lower levels of sadness and anxiety, with increased levels of positive emotions and motor activity⁹; reduced levels of apathy¹⁰; and reduced levels of aggressiveness and increased levels of communication.¹¹ However, the systematic reviews undertaken to date indicate the need for further research with larger sample sizes and descriptions of protocols.^{12,13,14}

With a view to contributing more information, the aim of the current study was to evaluate the benefits of dog-assisted interventions in the emotional, behavioral, cognitive, and functional areas of the lives of dementia patients living in a care home for the elderly in Toledo, Spain.

METHODS

Participants

The research team designed an experimental study that used DAT as the intervention. The study was conducted at the Enoc Center, a nursing home, in Azucaica, Toledo, Spain. The research team reviewed the medical records of the center's residents to find potential participants.

Potential participants were included in the study if they: (1) had been residents of the center for at least one year prior to the study, (2) were over 65 years of age, (3) had dementia, as evidenced by a score lower than 25 on the Mini-Mental Status Examination (MMSE),¹⁵ and (4) had BPSD that affected them at the affective level, such as loss of interest, sadness, or apathy, and/or at the behavioral level, such as aggressiveness, hyperactivity or disinhibition. Residents who had allergies to animals were excluded from the study. Of the potential 27 participants, 6 were excluded based on the inclusion and exclusion criteria.

The study was carried out at the El Greco Elderly Centre, Azucaica, Toledo, Spain, so the initial selection was made by convenience, as the participants were all from this centre who

wanted to collaborate in the research. The initial data were obtained from the medical records and, applying the inclusion and exclusion criteria, we obtained a list of residents who were invited to participate in the study. Residents and their relatives were informed. Informed consent was signed by relatives in those cases where cognitive impairment made comprehension difficult. The study was conducted in accordance with the Declaration of Helsinki and the Ethics Committee of UCAM, which issued its approval (code CE031820).

Procedures

Group allocation. Three groups were formed with 7 participants each: (1) the intervention group, (2) the control group, and (3) the healthy group. The participants in the intervention and control groups had dementia and BPSD. Participants in the healthy group didn't have dementia but had some affective or behavioral symptoms. By including a group of residents not suffering from dementia, the study intended to evaluate the benefits of DAT for residents in the center as a whole. Participants in this healthy group were also informed and signed the informed consent form.

Those residents with dementia who signed the informed consent and agreed to attend the DAT were placed in one group, the intervention group, and those who consented to participate in the study but didn't want to attend the DAT were placed in another group, the control group.

The control and exposure groups were compared to see if they were homogeneous in cognitive impairment at baseline based on Pfeiffer's SPMSQ classification of severity and MMSE scores: (1) mild—between 17 and 25, (2) moderate—between 9 and 16, and (3) severe—lower than 8.

The comparison with the healthy group was only used to compare the affective and behavioural areas, as they were not cognitively impaired.

Intervention. The intervention and healthy groups attended the DAT in addition to the center's regular therapies, which were occupational therapy and physiotherapy, with a daily frequency. The control group didn't attend the DAT but did attend the center's regular therapies.

The study used, as a reference, the intervention protocol carried out in Schall and Espinoza's study,⁶ because it was designed and implemented by Eva Vegue Parra, one of the researchers for the present study, and significant improvements had been obtained in that study in the BPSD.

Outcome measures. Data were collected at baseline and postintervention. The measures used were: (1) the Mini-Mental Status Examination (MMSE) to evaluate aspects of the cognitive area,¹⁵ (2) the Modified Barthel index to evaluate the functional area,¹⁶ (3) the Yesavage Geriatric Depression Scale (GDS-VE): Short Form to evaluate the emotional area,¹⁷ and (4) the Neuropsychiatric Inventory scale (NPI) to evaluate the behavioral area.⁶ In addition, data were taken from clinical records on participants' gender, age, and period of residence at the center.

Intervention

The intervention consisted of two, 45-minute, weekly sessions with a dog over a six-month period. The exposure group attended both sessions, the healthy group only the A1 session and the control group did not attend either session.

The objectives for each session were set by the center's occupational therapist and the DAT technician based on participants' needs. The dog used for the intervention had been used for DAT for three years and had passed temperament, health, and fitness for grooming tests. The DAT technician had many years of DAT experience and specific training. The sessions were conducted by the center's occupational therapist, the technician, and the therapy dog in all cases, and in both types of programme sessions.

Session A1. Four sessions occurred each month, one per week. The session was for large groups and had sociocultural objectives, in which the dog was used as a vehicle for focusing attention. Its goals were emotional stimulation, connection with surroundings, motivation, attention, participation, and socialization.

At the start of an A1 session, participants were introduced to the dog from a distance without direct interaction, given the large size of group. The core activity included an explanation of the coming activity with the dog and of the use of any necessary props. The interaction was always random, based on a number or colour shown on the dice. In this way, we preserve the welfare of the dog and keep the attention of the participants by not knowing whose turn it will be to interact with the dog. At the close of the session, participants said goodbye to the dog from a distance in the same manner as the introduction at the start of the session, and they were asked how they found the experience and were reminded about the next session.

The program during the sessions included: (1) Perringo, a bingo game in which the dog has the numbers in a container on its harness' chest panel, so that participants can take numbers out and see if they match the ones on their cards; (2) snakes and ladders, a team game in which participants need to pass a series of tests with the dog until reaching the last box with the last test; (3) Simon Says, a game in which participants must imitate the positions adopted by the dog; and (3) You Say, a game in which participants must ask the dog to adopt a position depending on the color shown by the dice.

Session A2. The session was for smaller groups and worked on specific therapeutic objectives. Its goals were sensory, cognitive, functional, and emotional stimulation and control of behavior.

At the start of an A2 session, participants greeted the dog through stroking and/or grooming. Also participants received an explanation of the activities to be performed, and spatial and time orientation occurred. The core activity included an explanation of the coming activity with the dog and of the use of any necessary props. At the end of each session, relaxation exercises were carried out by brushing and petting the dog, discussed the session, and were reminded about the next session.

The program during the sessions included: (1) block 1: six sessions to establish a bond with the dog, during which

the dog was presented as an animal and as an individual; participants received information about its needs, learning, methods of communication with the dog, and correct handling; (2) block 2: six sessions with different topics—animals, seasons of the year, numbers, words, and food—aimed primarily at stimulating the cognitive area; (3) block 3: six sessions aimed primarily at stimulating the functional area—fine and gross motor skills, walking, and balance and coordination; and (4) block 4: six sessions aimed primarily at socioemotional stimulation, recognizing and expressing emotions, interaction with others, and participation.

Outcome Measures

The independent variables (VI) were participants' attendance at the DAT sessions, with two levels: attends the DAT, the intervention and healthy groups, or doesn't attend the DAT, the control group. The dependent variables (DV) were the scores on the four tests.

MMSE. The measure assesses the cognitive area: (1) memory, with four scores—0, 1, 2 and 3, based on the number of words remembered, and (2) concentration, with six scores—0, 1, 2, 3, 4, and 5, based on the number of operations successfully performed or the number of letters correctly spelled. Higher scores indicate a higher level of cognitive performance. It is a validated scale and widely used by professionals. Sensitivity is 0.87 and specificity 0.82.¹⁵

Modified Barthel index.¹⁶ The measure assesses the functional area, with three levels—performed without assistance, performed with assistance, or not performed. Each level has 10 sublevels, with the degree of assistance required increasing from zero to ten. Higher scores indicate a higher level of functioning. It is a validated scale and widely used by professionals. Its reliability is 0.86-0.92.

GDS-VE.¹⁷ It is a questionnaire widely used in centres, applied by professionals, which assesses affective symptoms. It has 15 items with two possible answers, YES or NO. Its sensitivity is 86% and its reliability is 0.95.

NPI.⁶ The measure assesses the area of behaviour, with three levels of severity: 1 = mild, 2 = moderate and 3 = severe, and five levels of frequency: 0 = never, 1 = occasionally, 2 = frequently, 3 = frequently and 4 = very frequently. The total score is obtained by multiplying the severity by the frequency, which is higher for a higher degree of severity and ranges from 0 to 144. Its sensitivity is between 95.45% and 100% and its reliability 0.91.

Statistical Analysis

All of participants' data were compiled in an Excel database, as shown in the Table 1, and analyzed using the SPSS statistics software platform (IBM, Armond, New York, EEUU). A statistical test was applied to assess the normality of the sample. Because the sample had fewer than 30 participants, the Shapiro-wilk test was indicated. A *P* value higher than .005 was obtained, so the normality of the sample was checked, and therefore, parametric tests were used.

Table 1. Each Participant's Data

Participant	Cognitive		Functional		Emotional		Behavioral		Gender	Age	DAT ^a	Tres
	St	End	St	End	St	End	St	End				
C1	11	11	90	90	6	6	16	16	F	93	0	1
C2	25	25	80	80	2	2	81	81	M	93	0	1.5
C3	2	2	35	10	2	2	4	4	M	69	0	2
C4	22	22	35	35	12	12	12	12	F	85	0	2
C5	21	19	80	80	7	7	21	21	M	88	0	3
C6	13	13	46	46	12	12	72	72	F	89	0	2.5
C7	25	25	53	53	8	8	4	4	M	85	0	1.5
H1	26	27	100	100	4	1	4	0	M	93	2	3
H2	25	26	75	75	3	1	6	0	M	84	2	3
H3	25	26	75	75	3	1	2	1	M	90	2	3
H4	25	28	75	75	2	1	2	1	M	90	2	2.5
H5	25	26	75	75	1	1	6	1	F	85	2	2
H6	25	27	75	75	1	0	4	0	F	79	2	2
H7	25	28	75	75	1	0	6	0	M	83	2	3
I1	10	15	0	0	5	1	8	0	M	86	1	3
I2	15	17	80	80	12	3	81	30	M	77	1	3
I3	24	27	100	100	2	1	4	1	M	82	1	2.5
I4	23	23	65	65	7	3	8	1	M	87	1	2
I5	4	6	35	35	7	4	8	1	F	74	1	1
I6	25	26	75	75	13	4	72	26	M	87	1	2
I7	23	23	90	90	5	1	4	1	M	91	1	3

^aassignment to groups: 0 = control group 1 = healthy group 2 = exposure group

Abbreviations: C, control group; H, healthy group; I, intervention group; DAT, dog-assisted therapy; Tres, residence time; St, initial score; End, final score.

The research team compared means for the baseline data, which showed no significant differences, and thus, permitted the team to state that the groups were homogenous at baseline. A paired sample *t* test was performed to analyze changes between baseline and postintervention.

The research team then performed a single factor analysis of variance (ANOVA) to discern differences between the intervention and healthy groups and the control group for each of the areas being studied. Lastly a Tukey HSD test was used to discern differences between the control, intervention, and healthy groups.

RESULTS

Of the 27 potential participants, 21 joined the study, and data from 21 participants were analyzed. Figure 1 shows the flow chart for participants. Table 2 describes the characteristics of the participants at baseline. Attendance rates were high throughout the program, with 2% nonattendance in the intervention group and 11% in the healthy group (data not shown).

Changes by Group

Significant changes occurred between baseline and postintervention for the intervention group in the cognitive and emotional areas, with *P* < .011 and *P* < .005, respectively, as shown in the Table 3. Improvement, although not a significant one, was also observed in the behavioral area, but the group's functional level remained unchanged.

Significant differences were also observed for that period for the healthy group in the cognitive, emotional, and behavioral areas, with *P* < .003, *P* < .008, and *P* < .003, respectively, but the functional level remain unchanged. No differences were observed in the control group between baseline and postintervention,

Differences Between Groups

Single factor ANOVA showed significant differences between the intervention group and the control group in the behavioral, emotional, and cognitive areas, with *P* < .037, *P* < .011, and *P* < .026, respectively (Table 4). The effect size in significant areas was large—between 1.46 and 1.82—indicating a considerable difference from zero (data not shown). The result of the test in the functional area wasn't significant (*P* < .304).

The secondary analysis performed using the Tukey HSD test confirms significant differences between the control and intervention groups, demonstrating improvement in the cognitive, behavioral, and emotional areas, with *P* < .025, *P* < .035, and *P* < .01, respectively, as shown in the Table 5. It also confirms significant differences between the control and healthy groups, demonstrating improvement in the cognitive, behavioral, and emotional areas, with *P* < .025, *P* < .035, and *P* < .09, respectively,

Figure 1. Flow Chart for Participants

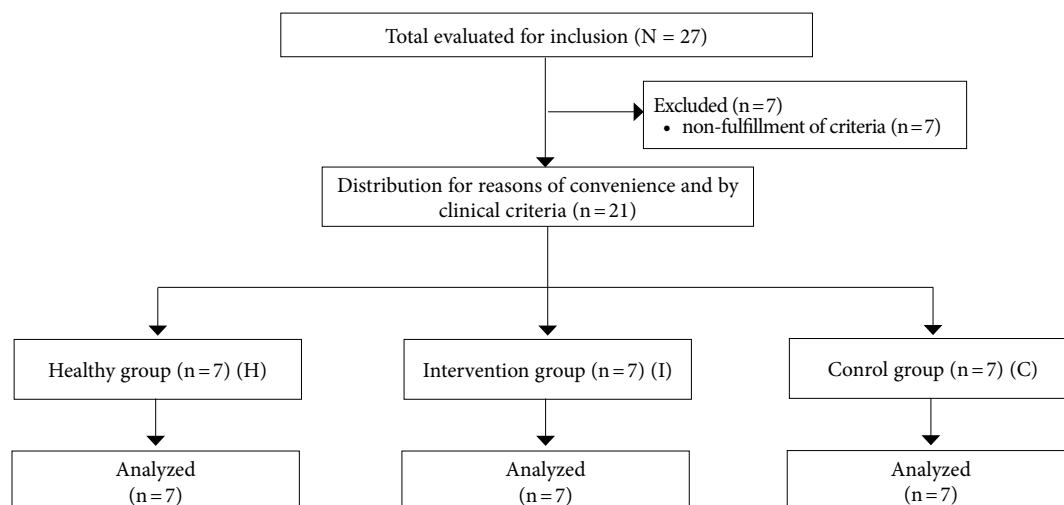


Table 2. Characteristics of Groups at Baseline (N = 21; n = 7 per Group)

	Control Group Mean ± SD	Intervention Group Mean ± SD	Healthy Group Mean ± SD
Age	86.00 ± 8.18	83.43 ± 6.08	86.29±4.89
Females, n (%)	4 (57.14)	6 (85.71)	5 (71.43)
Period of residency	1.93 ± 0.67	2.36 ± 0.75	2.64 ± 0.48
Cognitive	17 ± 8.62	17.71 ± 8.19	25.14 ± 0.378
Functional	59.86 ± 23.07	63.57 ± 34.84	78.57 ± 9.45
Emotional	7 ± 4.12	7.29 ± 3.94	2.14 ± 1.21
Behavioral	30 ± 32.45	26.43 ± 34.35	4.29 ± 1.80

Table 3. Changes by Group Between Baseline and Postintervention, Using a Paired Samples *t* test

Group	Area Studied	<i>t</i>	gl	<i>P</i> Value
Control	Cognitive	1	6	.356
	Functional	1	6	.356
	Emotional	1	6	
	Behavioral		6	
Intervention	Cognitive	-3.603	6	.011 ^a
	Functional		6	
	Emotional	4.250	6	.005 ^a
	Behavioral	2.242	6	.066 ^a
Healthy	Cognitive	-4.768	6	.003 ^a
	Functional		6	
	Emotional	3.873	6	.008 ^a
	Behavioral	4.823	6	.003 ^a

^a*P* < .05

Abbreviations: gl, degrees of freedom.

Table 4. Differences Between Groups Post-intervention, Using a Single Factor ANOVA

Area		SS	df	MS	F, <i>P</i> Value
Cognitive	Intergroup	382.95	2	191.47	F = 4.47
	Intragroup	770	18	42.77	
	Total	1152.95	20		<i>P</i> < .026 ^a
Functional	Intergroup	1807.71	2	903.85	F = 11.55
	Intragroup	12794	18	710.82	
	Total	147.81	20		<i>P</i> < .304
Emotional	Intergroup	147.80	2	73.90	F = 11.55
	Intragroup	115.14	18	6.39	
	Total	262.95	20		<i>P</i> < .011 ^a
Behavioral	Intergroup	3266.57	2	1633.28	F = 3.98
	Intragroup	7385.42	18	410.30	
	Total	10652	20		<i>P</i> < .037 ^a

^a*P* < .05

Abbreviations: ANOVA, analysis of variance; SS, sum of squares; df, standard deviation; MS, medium square.

Table 5. Differences Between Groups Postintervention, Using the Tukey HSD Test

Area	Paired Samples	Q Statistic	P Value
Cognitive	C vs H	3.49	.69
	C vs I	3.49	.025 ^a
	H vs I	3.49	.025 ^a
Functional	C vs H	14.25	.86
	C vs I	14.25	.28
	H vs I	14.25	.28
Emotional	C vs H	1.35	.43
	C vs I	1.35	.01 ^a
	H vs I	1.35	.09 ^a
Behavioral	C vs H	4.12	.15
	C vs I	3.89	.035 ^a
	H vs I	10.82	.035 ^a

^a $P < .05$

Abbreviations: C, control group; H, healthy group; I, intervention group.

DISCUSSION

The study revealed a significant differences in the improvements between the control group and the intervention group in the emotional, behavioral, and cognitive areas, suggesting that the DAT was effective for the intervention group in those areas.

For the healthy group, the study also showed significant improvements, which has led the current research team to think that DAT can be beneficial for persons who have some affective or behavioral symptoms and reside in institutional settings. The comparisons with the healthy group were made with the aim of observing the changes in people without dementia but with affective and behavioral symptoms. Although the research team can't draw clear conclusions, the results were promising in those areas for institutionalized elderly people. The current study's results support those obtained in previous studies in the emotional and behavioral areas.^{6,7,9,10,11}

The improvement in the cognitive area coincides with the results obtained by Menna et al (2016),⁸ although in that study the intervention differed considerably from that of the present study in terms of the type of session: A1 with a more playful character and large group and A2 in a smaller group and direct stimulation, while Menna et al (2016) have a weekly session of 20 participants with mild or moderate impairment.⁸ The aforementioned improvement wasn't observed in other studies, so further research is needed.

In terms of the limitations of the present study, the research team acknowledges the small sample size and allocation of participants. The participants all belong to the same centre, so a convenience sampling technique was used. In order to obtain comparable results for the general population, studies with larger sample sizes and multicentre studies in which a randomised as well as a controlled design can be applied are needed. For future lines of research, it would be interesting to carry out a followup study of the DAT program in several centers to see if the same results are achieved.

CONCLUSIONS

The current study's results affirm that the DAT program can provide benefits for residents with dementia in a residential center in the emotional, behavioral, and cognitive areas as well as for other elderly residents institutionalized in such centers.

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