Effectiveness of a dog-assisted therapy programme to enhance quality of life in institutionalized dementia patients.

Abstract:

The aim of this study was to assess the effectiveness of a dog-assisted therapy intervention to enhance quality of life in persons with dementia institutionalized in a public care home and to study its effect on the use of psychotropic medications.

A dog-assisted therapy intervention was designed, in which 34 residents of a public care home in Cuenca (Spain) participated. The participants were assigned to two groups, experimental and control group. The programme consisted of one weekly 50-minute session during nine months. Analysis of covariance (ANCOVA) was used to compare post training values between groups, using baseline values as covariates.

Our findings do seem to support the hypothesis that Animal-Assisted Therapy may contribute to enhance quality of life in residents in an aged care home. However, aspects such as the format, time and content of the sessions as well as their possibilities of reducing psychotropic medication require more research.

Keywords: Dog-assisted therapy; quality of life; dementia; institutionalization; nursing care.

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Introduction

In 2010, 35.6 million people were estimated to be living with dementia worldwide, with this number forecast to double every 20 years, to 65.7 million in 2030 and 115.4 million in 2050 (OMS, 2013). In consequence, the socioeconomic costs of dementia rose from US$ 604 billion in 2010 to US$ 810 billion in 2015, representing an increase of 35.4% (ADI, 2015).

More than 6 million people in Spain live with dementia, accounting for a prevalence of 7% in adults over the age of 65. This percentage increases to 50% in those aged over 80 years, equivalent to a total of 1.5 million patients. The annual cost of care for these patients is more than €50,000 million (Aulestia-Urrutia, 2013).

Dementia is undoubtedly one of the most significant health problems faced by society. Hence, the World Health Organisation proposes the implementation of plans and programmes in order to enhance the social well-being and quality of life of all those who suffer from dementia as well as their caregivers.

The importance of considering quality of life in the study of dementia is such that the International Working Group for the Harmonization of Dementia Guidelines has recommended that it be included as an outcome measure in all clinical trials in individuals with dementia (Rodriguez-Blazquez et al., 2015) .

The lack of curative treatment and the side effects of the medication used to treat dementia have prompted the use of non-pharmacological therapies. These are also administered to enhance quality of life in patients (Gómez-Gallego, Gómez-Amor, & Gómez-García, 2012). Moreover, these non-pharmacological therapies have now been established as a useful, versatile and potentially cost-effective tool to mitigate the

clinical manifestations of the disease and enhance the quality of life of both dementia patients and their caregivers (Olazarán et al., 2010).

This type of therapy attempts to delay the deterioration generated by the disease and also alleviate the behavioural and psychological problems it generally causes such as agitation, wandering, insomnia, apathy, depression, etc. These dementia-related symptoms not only generate risks for the patients and impair their quality of life, but also diminish the quality of life of their caregivers.

Over recent decades, a large number of non-pharmacological alternatives and therapies to complement pharmacological treatment have been developed, including Animal-Assisted Therapy (AAT). The International Association of Human–Animal Interaction Organizations, IAHAIO, defines AAT as "a goal-oriented, structured intervention that intentionally includes or incorporates animals in health, education and human service for the purpose of therapeutic gains in humans" (IAHAIO, 2014; Olsen et al., 2016).

Multiple benefits of AAT programmes for institutionalized dementia patients have been reported, such as increased social interactions between residents and between residents and caregivers (Kamioka et al.; Perkins, Bartlett, Travers, & Rand, 2008; Richeson, 2003); decreases in behavioural and psychological symptoms (McCabe, Baun, Speich, & Agrawal, 2002; Nordgren & Engstrom, 2012; Richeson, 2003); slower decline in deterioration of activities of daily living (Friedmann et al., 2015; Kamioka et al., 2014); and enhanced quality of life (Nordgren & Engstrom, 2014; Olsen et al., 2016).

Nonetheless, previous studies suggest certain aspects which should be the subject of further research, such as the relationship between AAT and decreased use of

psychotropic medication (McCabe et al., 2002; Richeson, 2003), or the limited number of studies on AAT interventions that indicate their cost or assess their cost-effectiveness (Bernabei et al., 2013; Kamioka et al., 2014; Olazarán et al., 2010; Stern, Pearson, & Chur-Hansen, 2011). Furthermore, the flawed nature of the studies available makes it necessary to conduct more rigorous research to obtain more reliable results (Stern & Chur-Hansen, 2013) .

Specifically, AAT with dogs seems to be well suited for persons with dementia because the dog provides companionship regardless of the person's cognitive function, and the dog listens without judgment (Nordgren & Engstrom, 2012). They are friendly, facilitate communication and interaction, and may also reinforce some positive behaviors in patients (e.g. throwing a ball, walking, or verbal responses) (Munoz Lasa, Ferriero, Brigatti, Valero, & Franchignoni, 2011).

In light of the above, the aim of this study was to assess the effectiveness of a dog-assisted therapy intervention to enhance quality of life in persons with dementia institutionalized in a public care home and to study its effect on the use of psychotropic medications.

Method

Design

A dog-assisted therapy intervention was conducted in a public residential aged care facility in Cuenca, Spain.

The average number of residents in the care home is 160, of whom 90% present some degree of dependence. The residents are assigned to different wards according to level of dependence and pathology.

The programme was administered from April 2016 to January 2017. There were two points of data collection: pre-intervention to collect baseline data, and post-intervention.

The study was conducted in accordance with the principles of the Helsinki Declaration (1975, rev.2000) and approved by   the Ethical Committee. For data collection, written permission from the management of the Aged Care Home was taken. Informed consent was taken from the participating professionals.

Sample

Of the 160 residents, 39 meeting the inclusion criteria for participation were selected and assigned to two groups, intervention and control.

We established the following inclusion criteria: 65 years or older and having a cognitive deficit score of less than 25 and more than 10 on the Mini Examen Cognoscitivo (MEC-30), first Spanish version of the Mini-Mental Status Examination (MMSE)(Lobo et al., 1999), This score range indicates that the patients have mild or moderate cognitive impairment, and is also within the score range used by the authors who validated the QOL-AD questionnaire in Spanish population (Gómez-Gallego et al., 2012) , being the scale used in our study; no allergy to dogs and/or other animals; resident in care facility for more than 3 months, ability to communicate and voluntarily consent to participate and/or consent from legal guardian.

The residents and/or legal guardians were informed of the programme by means of both a meeting and individual written documents. We requested written informed consent from participants, and if required, from the legal guardian, explaining also that they were free to drop out of the programme at any time they wished.

Following initial assessment of all 160 potential participants, those whose scores in the MEC-30 were higher or lower than those established in the inclusion criteria were

excluded. We held a meeting with the inter-professional team at the care home to determine which residents met the inclusion criteria. Those selected were randomly allocated by a ball draw to the control group or the intervention group.

The intervention group comprised 16 participants and the control group 23 residents, of whom 5 eventually preferred not to participate, leaving a total of 18 controls. The total sample consisted of 34 participants.

Intervention

In Spain, the animal-assisted therapy sector is unregulated and no specific training is required to conduct the activity, which means that any school or institution can teach the technique in any way they consider appropriate. Nonetheless, several universities offer Master's and Postgraduate programmes and the figure of expert and technician in animal-assisted therapy also exists, but the related qualifications are not official.

According to the Spanish Forum for Workers in Animal-Assisted Interventions, founded by professionals in the field to determine and clarify all matters concerning the profession, an expert in animal-assisted interventions is a professional on the field of health, education or social work specifically trained to administer animal-assisted interventions in order to achieve objectives previously established in cooperation with the recipient of the therapy. According to the same source, a technician in animal-assisted therapy is a professional with holistic training in the field of human relations and in the management and welfare of animals, whose aim is facilitate and reinforce the interaction between the therapy animal and the recipient of the intervention, following a pre-established protocol.

In the present study, the sessions were conducted by technicians in animal-assisted therapy. They were also responsible for covering all the dogs' needs and for ensuring they were in good conditions of health and hygiene, thus guaranteeing correct treatment of residents and animals. We followed the recommendations made by the

Spanish Forum for Workers in Animal-Assisted Interventions, which is currently developing a code of ethics for interventions with animals. The dogs used for the therapy were a three-and-a-half-year-old female Labrador Retriever and a five-year-old female Labrador-Golden Retriever. Both the technicians and the dogs that participated in the study had prior experience in Dog-Assisted Therapy in other care homes, and in care centres for persons with disabilities.

The participants of the intervention group received a weekly 50-minute-session of AAT. The sessions took place in a room used exclusively for this purpose, where participants, AAT practitioner and the dog were unaccompanied by other staff.

The professional staff at the care home and the researchers established the objectives of the AAT, which coincided with the general objective. The content of the sessions was planned to achieve the following specific objectives: to optimize the effectiveness of different cognitive capacities and functions, improve both fine and gross motor skills and enhance participants' social relations. The practitioners established the content of the sessions, which, responding to the specific objectives proposed, comprised activities focused on cognitive and motor functions, communication, recreational pursuits and wellbeing.

In the control group, the participants received treatment, care and services as usual what it includes psychological assistance, rehabilitation and occupational therapy, services that also continue to receive participants in the intervention group. No other non-pharmacological therapy was introduced during the period of the investigation for either of the two groups.

Costs

The costs generated by the intervention programme were those corresponding to hiring the AAT service, including therapists and care of dogs. The remaining costs were common to those receiving treatment as usual and those included in the intervention groups. No further costs related to the AAT programme were incurred since the

assistance of the residential care staff was not required nor was it necessary to adapt the room used for the sessions nor acquire any type of extra material or equipment.

The cost of 9 months of AAT amounted to 3,375 euros.

Measures

The dependent variables in this study were quality of life and the consumption of psychotropic medication in the participants, which were previously taken at the beginning of the intervention and in the week after the end of it.

Quality of life was measured using the Quality of Life in Alzheimer's Disease Scale (QoI-AD). The QoI-AD consists of two versions: a patient report and a caregiver report. In this study, we use the patient version (Gómez-Gallego et al., 2012). The scale is composed of 13 items that reflect an individual's subjective perception of different factors related to physical well-being: health, energy, mood, living situation, family, marriage, friends, self as a whole, ability to do household chores, ability to do things for fun, money and life as a whole. Scores range from 12 to 52 points; the higher the score, the higher is the quality of life.

The validation of this scale in Spanish population supports the idea that patients with mild or moderated dementia can, and should, assess their own quality of life or express their preferences (Gómez-Gallego et al., 2012; Motomura, Yagi, & Ohyama, 2004; Perkins et al., 2008).

The medical service at the care home provided the data on participants' consumption of psychotropic medication.

We collected data on the following sociodemographic variables before initiating the intervention: gender, age, length of time as resident (the mean time of residence is measured in years), marital status, educational level (defined as low in the case of

illiteracy, primary education or unfinished; medium, in the case of secondary or high school and high in the case of university studies), participation in activities, functional status and cognitive state.

Information on use of free time and participation in activities was provided by the sociocultural animation service at the care home, considering the number of activities each patient took part in.

Participants' functional state was assessed using the Barthel Activity of Daily Life (ADL) Index. The Barthel Index measures the functional capacity of individuals in relation to performance in a series of activities of daily living: feeding, bathing, dressing, grooming, bowels, bladder, toilet use, transfers, walking, and climbing stairs. The total score ranges between 0 (totally dependent) and 100 (totally independent) (Cid-Ruzafa, 1997).

Finally, cognitive impairment was measured using the MEC-30. This is a brief cognitive assessment with scores ranging from 0 to 30. The validity of MEC-30 in population of Spanish older adults, with the same cut-off points (23/24) as those recommended in the original standardization, and thus scores below the cut-off point indicate the presence of cognitive impairment. MEC-30 is the best version for international comparisons (Lobo et al., 1999).

These instruments were selected due to their verified validity and reliability and the availability of a version validated in Spanish-speaking population. Simplicity of completion was also a criterion of selection.

The questionnaires were administered by volunteers, previously trained in their application. The volunteers were blind to the experimental condition of the participants.

Statistical analysis

The data obtained for each of the variables were analysed using SPSS v 22.0 and Stata V14. Data on the sociodemographic variables were collected prior to the intervention: gender, age, length of residence in care home, marital status, educational level, participation in activities, functional state and cognitive state.

We conducted a comparative analysis on the variables of quality of life and number of medications at pre-and post-intervention, for both the control and the intervention group. In addition, although the literature states normality can be assumed for samples of more than 30 observations, we verified the normality of the variables, using Shapiro-Wilks and analysed the differences in the means between the intervention and control groups at pre- and post-intervention using the Wilcoxon signed ranks test.

Finally, analysis of covariance (ANCOVA) was used to compare post training values between groups, using baseline values as covariates.

To analyse the difference between the intervention group and controls over time, we opted for a mixed model, the "Delta" method, using quality of life, the Bathel Index and the number of medications taken as dependent variable. The time variable was modelled as a repeated variable, which allowed the number of observations in the study to be increased, making the results more robust.

The models are expressed as follows:

QOL-AD = a + b1 AAT+ b2 time+ b3 AAT*time

Index Barthel= a + b1 AAT+ b2 time+ b3 AAT*time

Medication= a + b1 AAT+ b2 time+ b3 AAT*time

The level of significance for the different analysis conducted (differences in means and covariance analysis) was set at $p < 0.05$.

Results

The details of the sociodemographic characteristics of the participants are shown in Table 1. The mean age of the total sample was 88.71 years, with a standard deviation (SD) of 1.05. The mean age of the intervention group was 89.3 years, with a SD of 1.87 and the mean age of the control group was 88.17 years, with a SD of 1.14. With regard to cognitive impairment, the scores on the MEC-30 ranged from 10 to 24, with a mean of 16.68 and a SD of 0.79. There were no differences in MEC-30 scores between the intervention and the control group, with a means score of 16.67 in the control group and 16.68 in the intervention group.

No significant differences were found between the intervention group and the control group at baseline, except for the case of the Barthel text, which presented significant differences.

During the intervention, we were unable to obtain measurements for certain participants. In addition, two participants in the control group died during the course of the study. As regards the measurements that we were unable to obtain for the quality of life test (Qol-AD) were 7, at intervention group for 2 residents and 5 at control group, in some cases the motive was admission to hospital and in the others the reason was illness. In the case of the psychotropic medications, the measurements for the participants who died during the study period are missing.

Table 2 shows, for the complete sample and for the two groups, intervention and control, the results obtained for quality of life and the use of psychotropic medications at the two measurement points, pre- and post-intervention. No significant variations were found for the overall sample or for either group.

Table 3 shows the difference between the mean pre- (0) and post- (1) AAT therapy scores for the intervention group and the control group in quality of life and consumption of psychotropic medications (See Table 3).

We found an increase in quality of life in both groups, -1.069 in the intervention group and -2.035 in the control group. The increase was only significant in the control group. We found no significant differences in the consumption of psychotropic medications.

The last of our analyses showed the differences over time between the intervention and control groups in the variables of quality of life, use of psychotropic medications and the Barthel Index. As can be seen in Table 4, quality of life showed a time effect but not a between-group effect. In other words, quality of life improved over time, but with no significant difference between the intervention group and controls.

In the case of the Barthel Index, the results revealed an effect of both time and between groups. The Barthel Index score decreased over time and a difference was also found between groups, with the mean score in the intervention group being 48.2 and in the control group 22.03.

No significant results were obtained for the medications taken.

Discussion

The aim of the current study was, based on a control group and an intervention group, to assess the effectiveness of dog-assisted therapy on dementia patients in a public aged care home with regard to quality of life and medication consumption.

The main finding of this study was that quality of life improved in both the intervention and the control group, with no significant difference between groups. No modifications were found as regards medication use.

All the participants were users of the same residential aged care facility, where the AAT therapy was implemented, and thus during the time the AAT sessions were being conducted, all the residents were able to see and interact with the dogs as they passed through the care home on their way to the room where the therapy was implemented.

Although these interactions were not reinforced, neither were they prevented. Thus, residents who coincided with the therapists and the dogs could greet them and even briefly pet the animals. The same occurred with the workers at the care home. This means that the residents in the control group also had access to these encounters and given that the intervention lasted nine months, over time, at the care home "everyone knew when the dogs came". Here, it is interesting to raise the question of the difference between dog-assisted therapy and visitation dogs, since the situation in our study may have given rise to the use of two dog-based interventions, but of different characteristics. Authors who have attempted to determine the characteristics and denomination of the different animal-based interventions (Parenti, Foreman, Meade, & Wirth, 2013) consider that animal-assisted therapy is conducted for therapeutic purposes, as part of a treatment complying with particular ethical and professional standards and is directed by especially qualified workers, while visitation animals are trained in basic skills to provide comfort and support to individuals through companionship and social interaction primarily in nursing homes, hospitals, and schools.

In light of the above, the participants in the control group might have benefitted from this situation, which could explain the results of our study related to quality of life in both groups.

This finding obliges us to consider whether the results for quality of life in institutionalized dementia patients would be the same using both types of intervention, according to the definitions mentioned above. On the one hand, some studies suggest that the presence of visitation dogs enhances quality of life and acts as a stimulus for residents, family members, visitors and workers (Baun & McCabe, 2003; Filan & Llewellyn-Jones, 2006; Kongable, Buckwalter, & Stolley, 1989), while, on the other hand, the previously mentioned lack of protocols or guidelines on the implementation of AAT programmes complicates this potential comparison.

Regarding enhanced quality of life, these findings are consistent with those of previous studies. A study conducted in Italy found an improvement, albeit non-significant, in quality of life in 5 of 9 participants, while improvement was only found in 2 of 11 participants in the control group (Moretti et al., 2011). A pre-test/post-test study conducted in four care homes in Sweden reports similar findings (Nordgren & Engstrom, 2014).

Nevertheless, findings in the literature are not conclusive. Another study found no significant changes in quality of life in a sample of patients with mild or moderate dementia (Olsen et al., 2016).

As regards the comparison between studies, it is necessary to consider the instruments used to measure the variables. Our study used the patient version of the QoL-AD scale. In this regard, some authors have questioned the validity of patient ratings of quality of life due to these individuals' cognitive impairment and lack of awareness of their own deficits (Rodriguez-Blazquez et al., 2015). However, the sample used to validate the Spanish version of the QoL-AD Scale showed high levels of internal consistency, even in the most cognitively impaired patients or those with a lower level of insight (Gómez-Gallego et al., 2012).

Regarding the results on the quality of life scales completed by the patients themselves, previous studies have shown that patient ratings tend to be maintained over time, with higher scores for men compared to women, while ratings are higher when questionnaires are completed by caregivers (Conde-Sala, Turro-Garriga, Garre-Olmo, Vilalta-Franch, & Lopez-Pousa, 2014).

These findings appear to be confirmed by the results obtained, on the one hand, given the tendency of the patients to maintain the QoL-AD scores over time, and on the other, given the higher percentage of male participants in the control group (50%)

compared to the intervention group (23.1%), the tendency of men presenting higher scores than women may arguably have affected the results obtained in our study.

In addition, according to certain studies, greater functional autonomy is associated with higher perceived quality of life (Conde-Sala et al., 2014; Rodriguez-Blazquez et al., 2015). In our study, we found that functional capacity declined over time in both groups. Given that it was the patients themselves who completed the quality of life questionnaires (QoL-AD), this may have affected their perception, reducing the possible effects of the intervention in the experimental group.

One of the strengths of this study is precisely the use of questionnaires completed by the patients themselves, which eliminates the positive bias occurring when these are completed by caregivers (be they professional or non-professional).

Another aspect that complicates comparison is the lack of stipulated guidelines on frequency, length, development and content of sessions. The literature shows that interventions have been administered following many different procedures (Perkins et al., 2008).

It is also worth noting that the mean age of our participants was high, which complicated assessment and measurement due to advancing dementia and/or other pathologies. This finding is also reported by other authors (Kawamura, Niiyama, & Niiyama, 2007; Nordgren & Engstrom, 2014).

Certain authors report other variables related to quality of life that might impact on findings. One of these is the importance of leisure and participation in recreational activities in quality of life during old age (Forjaz, 2015) . In this regard, it would also be interesting to investigate the relationship between the quality of life in institutionalized older adults and the length of residence in a care home, an aspect which, to the best of our knowledge, is not supported by data in the literature.

It is also necessary to consider that findings may depend greatly on the prior relationship between participants and animals, especially dogs. However, the data

obtained may still provide significant information on the positive effects of AAT in institutionalized dementia patients (Richeson, 2003).

The results regarding the consumption of psychotropic mediation are non-significant in both groups. We found no between-group or within-group differences, which is consistent with the findings of other studies (McCabe et al., 2002); Various studies have suggested that AAT might be an effective strategy to reduce symptoms commonly treated with prescription of psychotropic medication, such as depressive symptoms (Majic, Gutzmann, Heinz, Lang, & Rapp, 2013) and behavioural or psychological disturbances (McCabe, Baun, Speich, & Agrawal, 2002; Nordgren & Engstrom, 2012; Richeson, 2003). Thus, reducing these symptoms of dementia might lead to lower rates of prescription. The findings of these cited studies appear to support the need to determine the characteristics of AAT that might modify the prescription of psychotropic medications. Nonetheless, in light of the results of our study in this regard, we can conclude that, to the best of our knowledge, AAT does not represent an alternative to pharmacological treatment, but AAT programmes are recommendable as components of multidisciplinary treatments for dementia patients (Motomura et al., 2004).

Previous studies on animal-assisted therapy in clinical neurological samples have also concluded that there is increasing scientific evidence showing AAT interventions provide a complementary strategy to other existing therapies (Munoz Lasa et al., 2011).

Limitations

One of the limitations of this study is the small sample size. This and other limitations described below oblige us to interpret our results with certain caution.

The use of just one instrument to measure quality of life may be insufficient due to the difficulties involved in assessing this construct in individuals living with dementia, since they may present memory loss and have difficulties to understand the questions, express ideas and make judgements on their own experiences (Rodriguez-Blazquez et al., 2015).

Furthermore, the number of sessions, one 50-minute session per week, may not have been sufficient for differences to emerge between groups. This may indicate the need to establish a minimum number of sessions if we wish our findings to be more robust, given that the frequency used in this study, although positive, generated similar effects to free interaction and presence of dogs in the care centre.

The different measures used in the study were administered by volunteers, but not always the same ones. This may have affected the assessment of the questionnaires. Despite our sample comprising participants who were all residents of the same care home represents a significant contamination bias, as previously mentioned, it also means that differences potentially stemming from structural or organizational causes with samples from different care centers are avoided.

Although the current study has a small sample size and certain limitations which oblige us to be cautious in interpreting the results, our findings do seem to support the hypothesis that AAT may contribute to enhance quality of life in residents in an aged care home. Accordingly, we consider that it would be very interesting to make a larger study including different nursing homes where the nursing homes themselves are divided into either intervention or control group to avoid contamination that emerged in the present study.

In addition, the format, frequency and duration of AAT sessions and their possibilities of reducing or eliminating psychotropic medication require more research.

Regarding implications for practice, in light of our results, it would be interesting to conduct more than one session a week, and also to evaluate the implementation of the sessions by means of one-to-one interactions to reinforce the results. Moreover, although some studies are weak in experimental design, overall research reveals multiple indications with few, or no, contraindications for the use of AAT. Thus, providing this type of non-pharmacological therapy in long-term care facilities may improve the quality of life of residents.

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Declaration of Conflicting Interests

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References

ADI. (2015). Informe mundial sobre el Alzheimer 2015. In A. D. International (Ed.). Londres.

Aulestia-Urrutia, K. (2013). El Alzheimer en España. *Enlace en red, 25*, 24-29.

Baun, M. M., & McCabe, B. W. (2003). Companion animals and persons with dementia of the Alzheimer's type: Therapeutic possibilities. *American Behavioral Scientist, 47*(1), 42-51.

Bernabei, V., De Ronchi, D., La Ferla, T., Moretti, F., Tonelli, L., Ferrari, B., . . . Atti, A. R. (2013). Animal-assisted interventions for elderly patients affected by

dementia or psychiatric disorders: a review. *J Psychiatr Res, 47*(6), 762-773. doi:10.1016/j.jpsychires.2012.12.014

Cid-Ruzafa, J. (1997). Valoración de la discapacidad física: el índice de Barthel. *Rev. Esp. Salud Pública, 2*, 127-137.

Conde-Sala, J. L., Turro-Garriga, O., Garre-Olmo, J., Vilalta-Franch, J., & Lopez-Pousa, S. (2014). Discrepancies regarding the quality of life of patients with Alzheimer's disease: a three-year longitudinal study. *J Alzheimers Dis, 39*(3), 511-525. doi:10.3233/jad-131286

Filan, S. L., & Llewellyn-Jones, R. H. (2006). Animal-assisted therapy for dementia: a review of the literature. *International Psychogeriatrics, 18*(1041-6102 (Print)), 597-611.

Forjaz, M. (2015). Salud y calidad de vida en personas mayores con demencia institucionalizadas. In C. Rodriguez-Blázquez (Ed.), (pp. 143). Madrid: Escuela Nacional de Salud, Instituto de Salud Carlos III. Ministerio de economía y competitividad.

Friedmann, E., Galik, E., Thomas, S. A., Hall, P. S., Chung, S. Y., & McCune, S. (2015). Evaluation of a pet-assisted living intervention for improving functional status in assisted living residents with mild to moderate cognitive impairment: a pilot study. *American Journal of Alzheimer's Diseases and other Dementias, 30 (3)*(1938-2731 (Electronic)), 276-289. doi:10.1177/1533317514545477

Gómez-Gallego, M., Gómez-Amor, J., & Gómez-García, J. (2012). Validación de la versión española de la escala QoL-AD en pacientes con enfermedad de Alzheimer, cuidadores y profesionales sanitarios. *Neurología, 27*(1), 4-10.

IAHAIO. (2014). The AIHAIO definitions for animal assisted intervention and guidelines for wellness of animals involved. In.

Kamioka, H., Okada, S., Tsutani, K., Park, H., Okuizumi, H., Handa, S., . . . Mutoh, Y. (2014). Effectiveness of animal-assisted therapy: A systematic review of randomized controlled trials. *Complementary Therapies in Medicine, 22*(1873-6963 (Electronic)), 371-390.

Kawamura, N., Niiyama, M., & Niiyama, H. (2007). Long-term evaluation of animal-assisted therapy for institutionalized elderly people: a preliminary result. *Psychogeriatrics, 7*(1), 8-13.

Kongable, L. G., Buckwalter, K. C., & Stolley, J. M. (1989). The effects of pet therapy on the social behavior of institutionalized Alzheimer's clients. *Arch Psychiatr Nurs, 3*(4), 191-198.

Lobo, A., Saz, P., Marcos, G., Dia, J., de la Cámara, C., Ventura, T., . . . Aznar, S. (1999). Revalidación y normalización del Mini-Examen Cognoscitivo (primera versión en castellano del Mini-Mental Status Examination) en la población General Geriatrica. *Medicina clinica, 112*(20), 767-774.

Majic, T., Gutzmann, H., Heinz, A., Lang, U. E., & Rapp, M. A. (2013). Animal-assisted therapy and agitation and depression in nursing home residents with dementia: a matched case-control trial. *Am J Geriatr Psychiatry, 21*(11), 1052-1059. doi:10.1016/j.jagp.2013.03.004

McCabe, B. W., Baun, M. M., Speich, D., & Agrawal, S. (2002). Resident dog in the Alzheimer's special care unit. *Western journal of nursing research, 24*(6), 684-696.

Moretti, F., De Ronchi, D., Bernabei, V., Marchetti, L., Ferrari, B., Forlani, C., . . . Atti, A. R. (2011). Pet therapy in elderly patients with mental illness. *Psychogeriatrics, 11*(2), 125-129. doi:10.1111/j.1479-8301.2010.00329.x

Motomura, N., Yagi, T., & Ohyama, H. (2004). Animal assisted therapy for people with dementia. *Psychogeriatrics, 4*(2), 40-42. doi:10.1111/j.1479-8301.2004.00062.x

Munoz Lasa, S., Ferriero, G., Brigatti, E., Valero, R., & Franchignoni, F. (2011). Animal-assisted interventions in internal and rehabilitation medicine: a review of the recent literature. *Panminerva Med, 53*(2), 129-136.

Nordgren, L., & Engstrom, G. (2012). Effects of animal-assisted therapy on behavioral and/or psychological symptoms in dementia: a case report. *American Journal of Alzheimer's Disease and other Dementias, 27*(1938-2731 (Electronic)), 625-632.

Nordgren, L., & Engstrom, G. (2014). Animal-assisted intervention in dementia: effects on quality of life. *Clinical Nursing Research, 23 (1)*(1552-3799 (Electronic)), 7-19.

Olazarán, J., Reisberg, B., Clare, L., Cruz, I., Peña-Casanova, J., del Ser, T., . . . Lai, C. (2010). Eficacia de las terapias no farmacológicas en la enfermedad de Alzheimer: una revisión sistemática. *Dement Geriatr Cogn Disord, 30*(2), 161-178.

Olsen, C., Pedersen, I., Bergland, A., Enders-Slegers, M. J., Patil, G., & Ihlebaek, C. (2016). Effect of animal-assisted interventions on depression, agitation and quality of life in nursing home residents suffering from cognitive impairment or dementia: a cluster randomized controlled trial. *Int J Geriatr Psychiatry, 31*(12), 1312-1321. doi:10.1002/gps.4436

OMS. (2013). Demencia, una prioridad en salud pública. In. Washington, D.C.

Parenti, L., Foreman, A., Meade, B. J., & Wirth, O. (2013). A revised taxonomy of assistance animals. *Journal of rehabilitation research and development, 50*(6), 745-756. doi:10.1682/JRRD.2012.11.0216

Perkins, J., Bartlett, H., Travers, C., & Rand, J. (2008). Dog-assisted therapy for older people with dementia: a review. *Australas J Ageing, 27*(4), 177-182. doi:10.1111/j.1741-6612.2008.00317.x

Richeson, N. E. (2003). Effects of animal-assisted therapy on agitated behaviors and social interactions of older adults with dementia. *American Journal of Alzheimer's Disease and other dementias, 18*(1533-3175 (Print)).

Rodriguez-Blazquez, C., Martin-Garcia, S., Frades-Payo, B., Paris, M. S., Martinez-Lopez, I., & Forjaz, M. J. (2015). [Quality of life and health status in institutionalized elderly with dementian]. *Rev Esp Salud Publica, 89*(1), 51-60. doi:10.4321/s1135-57272015000100006

Stern, C., & Chur-Hansen, A. (2013). Methodological Considerations in Designing and Evaluating Animal-Assisted Interventions. *Animals : an open access journal from MDPI, 3*(1), 127-141. doi:10.3390/ani3010127

Stern, C., Pearson, A., & Chur-Hansen, A. (2011). The Economic Feasibility of Canine-Assisted Interventions (CAIs) on the Health and Social Care of Older People Residing in Long Term Care: A Systematic Review. *The JBI Database of Systematic Reviews and Implementation Reports, 9*(32), 1341-1366.

Tables

Table1. Sociodemographic data

Characteristics	Total (N=34) n	%	Mean (SD)	Intervention group (N=16) n	%	Mean (SD)	Control group (N=18) n	%	Mean (SD)	Comparison of groups t	p
Age	34		88.71(1.05)	16		89.31(1.87)	18		88.17(1.14)	0.54	0.595
Gender	34									0.95	0.351
Male	9	26.5		3	18.8		6	33.3			
Female	25	73.5		13	81.2		12	66.7			
Marital status	34									0.00	1.00
Single	8	23.5		4	25		4	22.2			
Widowed	18	53		8	50		10	55.6			
Married	8	23.5		4	25		4	22.2			
Educational level	34									-1.37	0.18
Basic	32	94.1		16	100		16	88.9			
Medium	0	0		0	0		0	0.0			
Higher	2	5.9		0	0		2	11.1			
Length of residence in care home(years)	34		6.65(1.53)	16		5.31(1.29)	18		7.83(2.67)	-0.82	0.42
Number of activities	34		0.82(0.16)	16		0.94(0.25)	18		0.72(0.21)	0.66	0.512
MMSE	34		16.68(0.79)	16		16.69(1.08)	18		16.67(1.17)	0.01	0.99
Barthel Index	34		40.59(5.39)	16		59.38(7.98)	18		23.89(4.65)	3.95	<0.001
QOL-AD 1	27		29.37(1.12)	13		30.85(1.501)	12		29.00(1.614)	0.91	0.372
Psychotropic medications	34		1.35(0.17)	16		1.13(0,20)	18		1.56(0,27)	-1.25	0.221

Table 2.Results for the study variables in each group

Group		Pre-intervention		Post-intervention	
Characteristics	n	Mean (SD)	n	Mean (SD)	
Total sample					
QOL_AD[a]	27	29.37(1.12)	27	31.89(0.897)	
Psychotropic medications	36	1.38(0.184)	32	1.34(0.188)	
Intervention group					
QOL_AD[a]	14	30.85(1.501)	14	32.46(1.274)	
Psychotropic medications	16	1.15(0.222)	16	1.15(0.249)	
Control group					
QOL_AD[a]	13	29.00(1,614)	13	31.50(1,406)	
Psychotropic medications	16	2.00(0,326)	16	1.75(0,351)	

[a] Quality of Life in Alzheimer's Disease Scale

Table 3. Comparison of pre- and post-intervention results by group[a]

	Total Sample			Intervention Group			Control Group		
	n	mean (SD)	p	n	mean (SD)	p	n	mean (SD)	p
QOL_AD_0-QOL_AD_1[b]	27	-2.076(0.841)	0.038	14	-1.069(1.04)	0.285	13	-2.035(1.37)	0.042
Psychotropic med._0-Psychotropic med._1	32	-0.647(0.159)	0.518	16	-0.378 (0.170)	0.705	16	-0.557(0.274)	0.577

[b] Quality of Life in Alzheimer's Disease Scale

[a] The differences in the means were calculated using the Wilconson signed rank test

Tabla 4. Differences between repeated measures pre- and post-intervention (Delta-method[a])

			Adj. Mean[b]	Std. Err	t	p	[95% conf. Interval]	
QOL-AD[c]	AAT[d]	Intervention	30.74	0.9	34.29	<0.001	28.96	32.52
		Control	28.62	0.89	32.26	<0.001	26.85	30.38
Barthel Index	AAT	Intervention	48.2	5.22	9.24	<0.001	37.76	58.63
		Control	22.03	5.14	4.29	<0.001	11.76	32.31
Medication	AAT	Intervention	1.09	0.18	6.05	<0.001	0.73	1.46
		Control	1.59	0.18	9.05	<0.001	1.24	1.94

[a] Delta method allows the number of observations to be increased at both pre- and pos-interventions

[b] Adj mean are the means of the repeated observations over time in order to analyse the effect of intervention

[c] Quality of Life in Alzheimer's Disease Scale

[d] Animal Assisted Therapy

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