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THE EFFECTIVENESS OF ANIMAL ASSISTED THERAPY ON SOCIAL INTERACTION: A META-ANALYSIS

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ABSTRACT

Animal-assisted therapy (AAT) is one of the non-pharmacological and complementary interventions. AAT has been practiced for many years and now a lot of progress are being made. However, the effect of AAT on social interaction is not well understood. The purpose of this meta-analysis was to present the best available evidence regarding the effects of AAT on social interaction including blood pressure, cognitive function, and communication. Researchers searched seven electronic databases for relevant articles published between 1984 and 2014. Data were collected using inclusion and exclusion criteria. The Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument was used to evaluate the quality of the identified articles. Six RCTs and three pseudorandomized controlled trial published within 1995-2011 with 281 participants had extractable data. The result of the meta-analysis indicated that AAT had an effect on increasing communication. The results were not statistically for blood pressure and cognitive function. There are a number of promising indications, in view of the limited number and quality of studies and the variation in results among studies. This review highlights the need for additional well-designed trials to draw conclusions that are more robust.

Keywords: Animal-assisted therapy (AAT); blood pressure; cognitive function; communication

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INTRODUCTION

The elderly people spend a lot of time at home and do not have sufficient care from others. One solution is the elderly should stay in an institution or in elderly nursing home. This will improve the quality of the elderly health. The separation from family and home environment will have an effect on the welfare of individuals because of stress and loneliness (Nummela, Seppanen, & Uutela, 2011). Stress and apathy is an early symptom of separation (Mehta et al., 2008). This is almost happening everywhere in the elderly. Therefore, it becomes motivation for health workers to design activities at low prices to reduce the negative effects of separation (Garatachea et al., 2009).

According to a survey on senior citizens in Taiwan, the elder had been hospitalized the most (87.61%). It claimed that they needed care from others and someone to talk. For instance, 77.15% of the participants felt unhappy and 26.71% were lonely. In the local nursing home, more than 70% elders felt lonely (Lin, 2007). Based on these data and the

results of other surveys, a health professional should provide activities to provide positive effects for the resident. The activities do not only have a positive effect on psychological but also physical and social. Many nursing homes utilize music, animal-assisted, movie, drawing and spiritual therapies. The activities are considered complementary therapies for elders.

Activities are provided to trigger patients' attention with agitation. Health workers will provide interventions to improve social interaction or a fun activity to be completed by elderly patients. The activity is an effective non-pharmacological intervention (Sadowsky & Galvin, 2012). Animal-assisted therapy is one of non-pharmacological and a complementary intervention using animals, usually dogs which are trained to be obedient, calm, and comforting, for therapeutic benefit across a broad range of medical conditions (Harper et al., 2014). AAT most commonly involves interaction between a client and a trained animal, facilitated by a human handler, with a therapeutic goal such as improving relaxation, nutrition, social interaction, as well as pleasure, reducing agitation, and offering physical therapy or rehabilitation such as brushing a dog with a stroke-affected limb (Filan & Llewellyn-Jones, 2006).

AAT provides opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance the quality of life. AAT is a goal-directed intervention in which an animal that meets specific criteria is an integral part of the treatment process. AAT is directed and/or delivered by a health/human service provider working within the scope of practice of his/her profession. AAT is designed to promote improvement in human physical, social, emotional, and/or cognitive functioning. AAT is provided in a variety of settings and may be cooperative or individual in nature (Reed, Ferrer, & Villegas, 2012).

In view of these facts, it can be observed that the elderly in nursing home is still regarded as a taboo issue, and embarrassment, ignorance, and the fear of stigmatization lead to little coverage of such a topic within society. This gives rise to the fact that there are still many people who treat their relatives at home without seeking the help of the existing support services, such as counseling services for caring relatives, care points and self-help groups. The result is an increased burden on care givers as well as on old people who suffered (Vogt, 2013).

Nordgren and Engström (2014) on quasi experimental study found evidence that AAT may have effects on behavioral and psychological symptoms. AAT can increase social interaction with patients diagnosed with dementia. It is well known in research design that evidence grading is the highest for a SR (systematic review) with meta-analysis of RCTs. Although many studies have reported that AAT has effects on physiological, psychological and social behaviors of the elderly in a nursing home (Herzog, 2011), however there is no SR with meta-analysis of the evidence based on RCTs conducted on the effect of AAT. Therefore, the objective of this review was to summarize the evidence from RCTs on the effects of AAT.

METHOD

The concerned databases are PubMed, EBSCO (MEDLINE, CINAHL, and Academic Search Complete), Cochrane, Web of Science, Scopus British Nursing Index, JBI and

references. The relevant articles were published in English or Chinese between 1996 and 2014. All of studies have three stages as follows: the first initial limited search of MEDLINE and CINAHL was undertaken followed by analysis of text words contained in the title and abstract, and the index terms used to describe articles. Second is searching for articles based on all identified keywords, index term and MeSH headings taken from across all included databases. Finally, the reference lists of all identified reports and articles were the words used to search for studies in various databases are as the following additional studies.

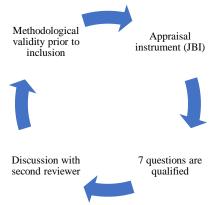


Figure 1. Appraise research qualities

RESULTS

Review Research Article

The concerned databases are PubMed, EBSCO (MEDLINE, CINAHL, and Academic Search Complete), Cochrane, Web of Science, Scopus British Nursing Index, JBI and references. The relevant articles were published in English or Chinese within 1990 and 2014. The results of the search obtained 229 studies based on the title criteria. Based on the abstract, it gained 42 studies. After obtaining the studies based on the inclusion criteria, critical Appraisal was done to determine the quality or desired standards.

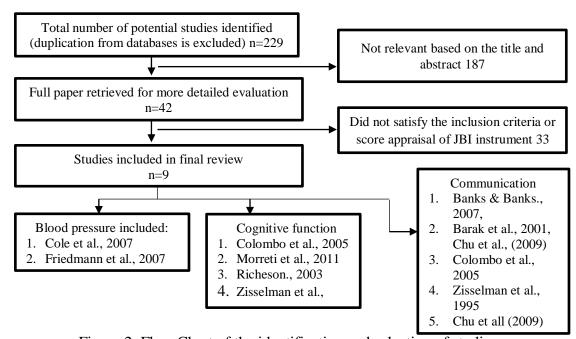


Figure 2. Flow Chart of the identification and selection of studies

The included studies were published within 1995 and 2011. They were conducted in various countries including USA, Italy, Israel, Taiwan, and Australia. All studies measured the effectiveness of AAT on elderly in nursing home, which allowed the pooling of available research data for the topic. For the purpose of this review, 2 articles on blood pressure, 4 articles on cognitive function and 5 articles on communication were finalized.

Summary of Articles

Author describes the study summary which is based on abstract and additional in the paper. Summary included studies, design, place, purpose, results, participants, and interventions.

Table 1. Summary of articles based on additional elements of studies

Summary of articles based on additional elements of studies				
Study/Method/Setting/Aim	Participants	Intervention	Outcomes	
Banks & Banks (2007); USA study; quasi-RCT; long-term care facilities	Resident in long term care	IG= AAT intervention	Communication score was significant.	
in a city in southern Mississippi. Aim: to determine whether AAT can objectively improve the communication	75-85 years old. IG once/week=15 , IG three times/week=1	once/week and three times/weeks. CG= no AAT	Aat-1 (one 30-minute session of AAT/week), and aat-3 (three 30-minute sessions of AAT/week).	
Morreti et al. (2011); Italy study; quasi-experimental; nursing home. Aim: to evaluate the effects of a pet therapy intervention on cognitive function	S and CG=15 Resident in institutionalization IG = 10 CG= 11	IG= AAT intervention CG= no AAT	The MMSE (cognitive function) scores in the control-group increased by two points, but differences were not statistically significant (<i>p</i> = 0.0941)	
Barak et all. (2001); Israel study; RCT; long-stay resident. Aim: to evaluate the effect of AAT on communication in long-stay geriatric schizophrenic patients.	long-stay resident mental health center IG=10 CG=10	IG= AAT intervention CG= reading and discussion	The measurement of communication score indicating significant improvement by 6 month.	
Zisselman et al. (1995); Pennsylvania study; RCT; Geriatric Psychiatry Unit Aim: To evaluate the efficacy of cognitive function and communication of elderly persons respond differently to pet therapy treatments	Geriatric Psychiatry Unit IG= 21 Exercise group= 25	IG= AAT intervention EG= exercise	Measurement of cognitive function and communication Follow up in 5 days	
Chu et al. (2009); Taiwan study; quasi-experiment, RCT; psychiatric institution. Aim: to evaluate the effects of animal-assisted activity on communication, and other psychophysiological aspects among Taiwanese inpatients with schizophrenia.	Psychiatric institution. Participant=15	IG= AAT intervention CG= received treatment as usual	Measurement of communication Follow up in 2 months	

Study/Method/Setting/Aim	Participants	Intervention	Outcomes
Colombo et al. (2005); Australia study; RCT; institutionalized elderly. Aim: to assess whether a pet therapy program had a favorable effect on communication and perception of quality of life in cognitively unimpaired institutionalized elderly.	Institutionalize d elderly Age= 60-80 CG= 27 IG= 23	CG= were given nothing, I plant G= were given a plant IG= were given a canary	Measurement of cognitive function and communication Follow up in 3 months
Richeson. (2003); Maine study; quasi experimental; nursing home. Aim: to investigate the efficacy of animal assisted therapy on cognitive function	Nursing home Age= > 60 years old. CG=15 IG=22	The intervention led by a therapeutic recreation professional, had contact with a therapy dog (or dogs) with a handler (or handlers).	Measurement of cognitive function Follow up in 5 days
Cole et al. (2007); USA study; RCT; hospitalized. Aim: To determine whether a 12-minute hospital visit with a therapy dog decrease blood pressure	Age= 18-80 years CG= 26 IG= 25	One group received a 12-minute visit from a volunteer with a therapy dog; another group, a 12-minute visit from a volunteer; and the control group, usual care. Data were collected at baseline, at 8 minutes, and at 16 minutes.	Measurement of blood pressure measurement Follow up 8 minutes, and at 16 minutes
Friedmann et all (2007); USA study; RCT; community-living older adults. Aim: to evaluate whether friendly dogs may be an effective intervention for blood pressure in older adult hypertensive.	A total of 11 community-living, older adults aged 65–94 CG=6 IG=5	The quiet-talk-quiet (QTQ) protocol was used to assess BP responses to speaking. The QTQ protocol, consisting of sitting silently for two minutes, talking for two minutes, and sitting silently for two minutes was repeated twice, once with an unfamiliar, friendly dog in the room, once without the dog.	Measurement of blood pressure measurement Follow up every 2 hour

The study findings are presented according to the three objectives set out in this review. Outcomes of AAT were manifested in blood pressure, cognitive function, and communication. Two articles (Cole et al., 2007, Friedmann et al., 2007) focused on

blood pressure. Four articles (Colombo et al., 2005, Morreti et al., 2011, Richeson., 2003, and Zisselman et al., 1995) focused on cognitive function and five articles (Banks & Banks., 2007, Barak et al., 2001, Chu et al., (2009), Colombo et al., 2005, and Zisselman et al., 1995) focused on communication.

The Effectiveness of AAT on Blood Pressure

In the study conducted by Cole et al. (2007), there was no improvement in the patients' blood pressure, due to their previous severe cardiac dysfunction. Patients would experience a drop in blood pressure when getting medication therapy or pharmacology. AAT may have effects on neurohormone which stimulates the nervous system of the patients with the surrounding environment.

Friedmann (2007) noted that AAT has only mild effect on hypertension in the elderly. Reduction in hypertension can be affected by stress levels so that patients with mild hypertension can be treated with AAT without medication. A decrease in the rate of repeat stress will have a significant effect on cardiovascular morbidity and mortality.

Systolic

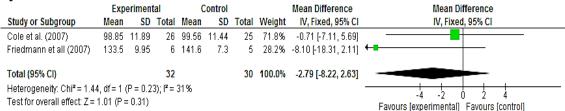


Figure 3. The comparison of AAT versus standard care in the outcome of systolic blood pressure.

Meta-analysis of AAT data revealed that the studies conducted by Cole et al. (2007) and Friedmann (2007) identified a positive reduction although not statistically significant in systolic blood pressure (Figure 2). The meta-analysis analysis showed no significant heterogeneity (p=0.23, x^2 =1.44). The overall effect size was -2.79, (95% CI [-8.22, 2.63], p = 0.31), indicating that although AAT reduced systolic blood pressure, the reductions were not statistically significant (Figure 3).

Diastolic

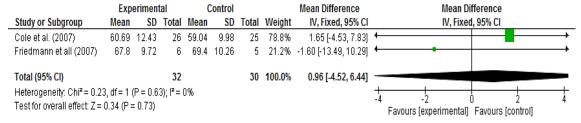


Figure 4. The Comparison of AAT versus standard care in the outcome of diastolic blood pressure.

Meta-analysis of AAT data revealed that the studies conducted by Cole et al. (2007) and Friedmann (2007) identified a positive although not statistically significant reduction in diastolic blood pressure (Figure 3). The meta-analysis showed no

significant heterogeneity (p=0.63, x^2 =0.23). The overall effect size was 0.96, (95% CI [-4.52, 6.44], p = 0.73), indicating that, although AAT reduced diastolic blood pressure, the reductions were not statistically significant (Figure 4).

Effectiveness of AAT on Cognitive Function

In the studies conducted by Colombo et al (2005) and Morreti et al (2011), the results showed that AAT improved the symptoms of depression by 50% in nursing homes. The results of the MMSE showed an increase in the statistical value almost two times after the employment of AAT. Difference can be observed between the control group and the AAT group. In addition, the quality of the life of the elderly also increases. These studies also proved to be clinically relevant, although the effect of pet intervention on cognitive function is only marginally significant. Indeed, the pet group gained on average 4.5 scores at MMSE; the mean increase was twofold higher in the pet-group than in the control-group. In Richeson's study (2003), samples were small and that could affect the outcome of AAT. Based on the observation, the researcher said that AAT intervention could reduce anxiety and could improve social interactions of people with dementia. MMSE scores declined at the time of intervention and increased during the follow-up phase.

Zisselman et al (1995) reported changes in the behavior of the patients. The results showed positive effects on the elderly. AAT-treated group were more self-functional than the group that was not given AAT. AAT helped the patients improve cognitive function and the quality of patients' life increased. As shown in the case, the patients with the most severe cognitive impairment were addicted to drugs for cognitive enhancement. Therefore, when patients did not take the drug, their cognitive function scores naturally decreased.

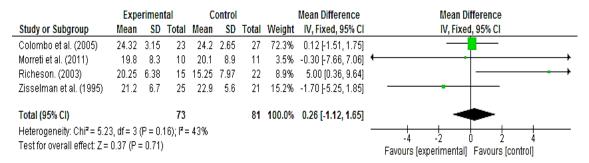


Figure 5. The Comparison of AAT versus standard care in the outcome of cognitive function.

Meta-analysis of AAT data revealed that the studies conducted by Colombo et al (2005), Morreti et al (2011), Richeson (2003), and Zisselman et al (1995), identified a positive but not statistically significant increase in the cognitive function (Figure 4). The meta-analysis showed significant heterogeneity (p=0.16, X^2 =5.23). The overall effect size was 0.26, 95% CI [-1.12, 1.85], (p = 0.71), indicating that, although AAT improved the cognitive function, the improved were not statistically significant (Figure 5).

Effectiveness of AAT on Social Behavior

Banks & Banks (2007) used a pretest/post-test design with control and intervention groups. The study showed that AAT can reduce loneliness. These were proven from the

observations results of the researchers including the observed incidents where the residents spontaneously communicated with the animals. The residents also spoke about their past experiences with their pets. It also found a positive to AAT because the participants showed their emotions and wanted the AAT activity to continue. Animals with human relationships can act as a catalyst for socialization or interaction of human beings. A research carried out by Barak et al (2001) showed significant results on a scale of social functioning in the intervention group before and after the AAT. An increase in the scores showed a positive effect on the communication of the elderly. The scale of social function includes conversation skills, social skills, social relationships, friendship, communication skills, as well as the interaction of the elderly during the implementation of AAT.

According to Colombo et al (2005), the members in the AAT group increased their social relationships. They could share their experiences with one another well which were concerned with their pet experiences in the past. AAT had positive effect on the communication among the members so that the quality of life of the elderly people increased. As indicated by Chu et al (2009), AAT activities had a positive effect on improving communication. It was affected by the harmonious relationship between animals and humans. This research aimed to improve the psycho-physiological status of the patients. During the eight weeks when the patients had been given AAT intervention, the patients always smiled while the dogs around. Some patients could recount their experiences with the animals. Zisselman et al (1995) conducted a study of a randomized, parallel-group control treatment trial with pre-treatment and post treatment measures. Women with dementia who received either pet therapy or exercise intervention had improved their irritable behavior after the treatment.

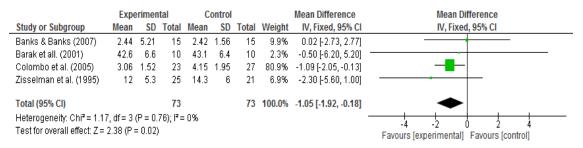


Figure 6. The Comparison of AAT versus standard care in the outcome of communication.

Five articles were related to the effect of AAT on communication. Meta-analysis of AAT data revealed that the studies done by Banks & Banks (2007), Barak et al (2001), Colombo (2005), and Zisselman et al (1995), identified a positive although not statistically significant increase in communication (Figure 5). The meta-analysis showed significant heterogeneity (p=0.76, x^2 =1.17). The overall effect size was -105, 95% CI [-1.92, 0.18], (p = 0.02), indicating that AAT improved communication; the improvement were statistically significant (Figure 6).

DISCUSSION

Based on the data collection, it obtained nine articles related to inclusion criteria. As many as 9 articles were found to have two articles that have more than one outcome which are Colombo et al (2005) and Zisselman et al (1995). The second article has

outcomes on cognitive function and communication. So that in conducting a metaanalysis, there were 11 articles that included into the inclusion criteria.

Otherwise, it is very broad criteria of location consisting of nursing home, psychiatric institution, long-term care facilities, and hospital. The wide scope of the criteria of the place makes AAT can be applied in various places. Collecting the data on communication contained 5 articles that enter into the inclusion criteria, but only four articles that can be involved in the meta-analysis. This is due to the incomplete statistical results attached. Therefore, the analysis was performed in description.

Based on the studies, the evaluation was done on the subject of 5741 male and female who have risk factors for cardiovascular disease, including blood pressure, cholesterol, and triglycerides. Pet owners' male had lower systolic blood pressure, but not diastolic blood pressure. Triglyceride levels decreased by 13%, while cholesterol levels decreased by 2%. The female over the age of 40 were affected significantly, as seen by the decrease in systolic blood pressure and triglyceride levels. While this beneficial effect is not large, the evidence suggested that even a 1% decrease in total cholesterol can make a two-fold reduction in the risk of cardiovascular death (Wolf et all, 2005). Relaxation or stress reduction techniques can also reduce blood pressure and cardiovascular death (Everson et al., 2001). This study only examined the effects of AAT against hypertension in the elderly.

In 1980, Friedmann and co-workers make a breakthrough in studying the effects of pet ownership in the life of myocardial infarction. This prospective study of 92 patients admitted to the coronary care unit concluded that people who have pets are independent predictors of 1-year survival and thus have an effect on coronary artery disease. Only 5.7% of the 53 subjects who owned pets died within 1 year after being admitted to hospital, while 28.2% of the 39 subjects who are not owners of animals touching in the same time period. This study was limited by the small sample size, measurement techniques, and the failure concerned was the severity of the disease (Friedmann, 1995).

Zisselman et al (1995) reported changes in the behavior of the patients. The results showed positive effects on the elderly. AAT-treated group were more self-functional than the group that was not given AAT. AAT helped the patients to improve their cognitive function and the quality of their life. As shown in the case, the patients with the most severe cognitive impairment were addicted to drugs for cognitive enhancement. Therefore, when patients did not take the drug, their cognitive function scores naturally decreased.

In this study, the patient can be observed in terms of their social behavior verbally ranged from 0/min in week-1 up to 4.7/min during weeks 7 and 9. In addition, nonverbal social behavior ranges between 0/min throughout the week 1-4 and week -11 to 1.3/min in week 7 and 9. The slight dip occurs to both verbal and nonverbal social behavior in week 8. Despite this decrease, the score remained higher or equal to those observed in other weeks when the dog did not accompany the participants. With the introduction of dogs in week 5, verbal and nonverbal social behavior of the participants increased notably. The behavior decreased during the last 2 weeks when the dog was no longer accompanied the patient (LaFrance et al, 2007).

In adult patients with chronic schizophrenia, dog-assisted therapy was linked to improvement in social contact, symptoms, and quality of life and related to social relationships, but in comparison to a control group without a dog differences, the effects were not significant (Villalta-Gil et al., 2009). In psychiatric inpatients, however, AAT leads to a significant increase in interactions with other patients over the course of 4weeks in comparison to rehabilitation without animals. This included smiles, sociability, helpfulness toward others, activation and responsiveness (Marr et al., 2000). Many animal-assisted interventions focus on elderly residents or patients. The presence of an animal positively affected social interaction with elderly psychiatric patients (Haughie et al., 1992) and verbal interaction among male nursing home residents (Fick, 1993).

There were several limitations to this review. The number of studies available for inclusion in this review was small, which reduce the generalizability of conclusion. In summary, AAT had a positive effect on social interaction. However, this effect was significant on communication. The findings from the present review suggested that AAT is safe to be used and may improve the social interaction outcome. The significant heterogeneity across studies precludes deriving any definite conclusions regarding the effect of AAT on social interaction.

In summary, AAT had positive effect on social interaction. The social interaction included blood pressure, cognitive function, and communication. However, this effect was significant on communication. The finding from the present review suggested that AAT can improve the well-being in elderly.

CONCLUSION

This review examined the effects of AAT on blood pressure, cognitive function, and communication. The results of the meta-analysis indicated significant effects of AAT on communication. However, the limited number of studies prevented us from making conclusions concerning the effects of AAT on blood pressure, cognitive function and communication.

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