Systematic Review

The use of animal-assisted practices as a nursing intervention: A systematic review

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Abstract

Objectives: The Nursing Interventions Classification is used for planning nursing care. Animal-assisted practices, an intervention within this classification, is a treatment method that is widely used around the world. However, its use is limited in Turkey. Animal-assisted practices, which are used to support various groups today, constitute an intervention option in addition to medical treatments, ensuring health protection and promotion. This systematic review aims to analyze the randomized controlled studies that used animal-assisted practices and to determine the effects of this procedure and the interventions made, thereby contributing to the literature.

Methods: The databases on this subject were analyzed without any limitations on the publication year, and a total of 1,985 studies were accessed. The search was made using the keywords "animal assisted therapy," "animal assisted therapies," "pet therapy," "pet therapies," and "nursing" in the CINAHL, Cochrane Central, Medline/Pubmed, Web of Science, and Science Direct; and the keywords "hayvan destekli uygulama," "hayvan destekli terapi," and "hemşirelik" in the electronic databases of the National Thesis Center of the Council of Higher Education and the ULAKBIM. Six randomized controlled studies that met the inclusion criteria were included in the study. These six studies were evaluated in terms of the characteristics of their samples, the animals used, the place of the practice, the measurement tools, and their results.

Results: All studies were conducted in the last six years. In the randomized controlled studies, the sample comprised 66.66% old people, 16.67% adults, and 16.67% adolescents. The studies were conducted in elderly care centers (33.33%), hospitals (33.33%), elderly day care center (16.67%), and healthcare centers and hospitals (16.67%); they used dogs (as live animal), robotic pets, and humanoid robots within the scope of the intervention programs. They used different measurement tools to evaluate the effectiveness of the intervention. Animal-assisted practices were found to reduce stress and the use of analgesics, positively affect vital signs, support other treatments for mental diseases, and increase self-esteem, social interaction, and quality of life.

Conclusion: The results of this study showed that animal-assisted practices were an effective nursing intervention. However, it was found that randomized controlled studies indicating the effectiveness of animal-assisted practices were limited, and that no studies have been conducted in Turkey on this subject. It is suggested that studies should be conducted which use animal-assisted treatment as a nursing intervention, the results of which would further contribute to the literature. It is recommended that animal-assisted practices should be included more in nursing studies.

Keywords: Animal-assisted practice; nursing intervention; systematic review.

The primary aim of nursing is to protect and promote individuals' health, and to provide them with care. Nursing care evaluates individuals in the biopsychosocial aspect and includes standardized care. Nursing diagnosis systems are used for planning nursing care. One such system is the Nursing Interventions Classification (NIC), which standardizes and

What is known on this subject?

• Animal-assisted practices (AAPs) are known to positively affect individuals' physical, mental and social healing. Animal-assisted practices are defined as "animal-assisted therapy" in the Nursing Interventions Classification (NIC).

What is the contribution of this paper?

• The results of this systematic review indicate that the use of AAPs by nurses is limited, but AAP is an effective and applicable intervention option in nursing care and practices, according to the low number of randomized controlled studies.

What is its contribution to the practice?

• This review summarizes the findings on the individuals or patient groups with whom AAPs can be implemented, the procedures implemented for the practice, and the study results. Based on these findings, the AAPs are considered to guide our colleagues during nursing care and raise awareness particularly on the use of AAPs in psychiatric nurses' practices.

classifies the interventions that nurses can use.[1–3] NIC defines AAPs as "animal-assisted therapy".[4–6] The use of AAPs is common around the world, but limited in Turkey.

AAPs enable the protection and promotion of individuals' health through the benefits of human-animal interaction. Practices related to the benefits of human-animal interaction have been used for a long time. The first studies indicating the use of animals in treatment were conducted in 1792 in York Retreat, England, where farm animals were used to improve the behaviors of patients with mental disorders.[7,8] In the 1800s, Florence Nightingale, one of the leaders in nursing, stated the importance of animals in the care and treatment provided to individuals as follows: "a small pet is a perfect friend for patients especially in the treatment of chronic diseases".[9–11]

AAPs are used in various areas, based on their intended use in the protection and promotion of individuals' health. AAPs are frequently used in the treatment of behavioral disorders in children with low academic success or low self-esteem, who experience problems in adapting to school, and whose social relationships are poor or not developed.[12] In addition, AAPs can be used in various institutions, such as prisons, detention homes, or psychiatric hospitals;[13] for individuals with mild or moderate autism within the scope of the care and treatment of psychiatric disorders;[14] to decrease or prevent the symptoms of depression, anxiety, or stress;[15] and to enable individuals to adapt to the physical and cognitive changes in the problems observed in childhood, adolescence, and old age.[16] AAPs are also used in addition to medical interventions for the treatment, care, and rehabilitation of arterial hypertension, cardiopathy,[13] chronic muscular and nervous system diseases, and different motor disorders,[14] since they strengthen the immune system,[17] decrease the disease symptoms, and accelerate healing.

AAPs involve programs designed to support and improve individuals in physical, emotional, and social aspects. Live, plush, or robotic animals (PARO-robotic pets, NAO-humanoid robots) can be used in AAPs.[18,19] These practices are carried out by various healthcare professionals, such as physicians, nurses, or psychologists.[20] Nurses can carry out the AAP pro-

grams in institutions such as nursing homes, hospitals, etc., or at home through home visits[20,21]—as a member of a team[22–24] or alone,[4,6] as an independent intervention.

The duties, authority, and responsibilities of psychiatric nurses are stipulated as "to continuously and systematically collect data using the therapeutic communication techniques and evidence-based assessment tools within a biopsychosocial integrity and implement the planned care process to protect and promote individuals' mental health" in the Regulation on the Amendment of the Nursing Regulation, which took effect on April 19, 2011, in Turkey.[25] The NIC includes interventions such as supporting individuals' interaction with animals and creating a safe environment for interaction, and it indicates activities regarding the practices within the scope of AAP.[4,6] In this regard, AAP is an applicable intervention method within the scope of psychiatric nurses' practices. The use of AAPs in nursing care is limited in the literature, and no studies have been found to use AAPs as a nursing practice in Turkey. This systematic review was conducted on the randomized controlled studies (RCS) that used AAPs as a nursing intervention, and the results of these studies are presented as a whole. Discussion of the study results is considered to be effective in making the use of AAPs as an intervention in nursing care and practices widespread.

Materials and Method

Aim: This systematic review aims to analyze the RCSs that used AAPs and to determine the effects of the procedures of AAPs and the interventions made, thereby contributing to the literature.

Scope of the Study: This review includes the RCSs conducted within the scope of nursing intervention as appropriate to the subject. The studies that were conducted on the AAPs but were not randomized controlled studies, were not conducted within the nursing intervention, and did not include a nurse among the researchers were excluded.

Study Questions: This research focuses on the following questions:

• On which groups were the AAPs studied?

• How were the procedures and duration of the AAP structured?

• Which animal was used in the AAP?

• In which institutions were the AAP studied?

• Which assessment tools were used to assess the study results?

• What are the study results?

This study was reported in line with the PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) guide used in systematic reviews and meta-analyses.[26] Ethics committee approval was not required, as the study data would be obtained from published studies in the literature.

Literature Review

The electronic databases of CINAHL, Cochrane Central, Medline/Pubmed, Web of Science, Science Direct, National Thesis Center of the Council of Higher Education, and ULAKBIM were used in this systematic review. The search was made between February 1 and 14, 2019, in both Turkish and English, without making any limitations on the year of publication. The keywords used during the search were formed in the PICOS (P: Population, I: Interventions, C: Comparisons, O: Outcomes, S: Study designs) using the MESH terms (Table 1). The repeated studies (duplicates) were determined using the EndNote x7 program. After the studies' titles and abstracts were screened by the researchers independently, the results of the screenings by each researcher were assessed, and six studies were included in this systematic review (Fig. 1).

Inclusion and Exclusion Criteria

The inclusion criteria for this systematic review were identified based on the PICOS (P: Population, I: Interventions, C: Comparisons, O: Outcomes, S: Study designs) format.

Inclusion Criteria

Participants	Individuals for whom animal-assisted practices were carried out
Interventions	Animal-assisted practice programs
Comparison group	Those for whom animal-assisted practice intervention was carried out and those for whom it was not carried out
Outcomes	Studies on the animal-assisted practices in which nurses worked were included. The study results indicated that the AAPs reduce individuals' stress levels and use of analgesics, regulate their vital signs, reduce depressive moods and agitated behaviors, increase individuals' self-esteem, social interaction, and quality of life, as well as children's school attendance rate, and serve as an additional support to the other treatments for mental disorders, such as depression and anxiety.
Study design	The randomized controlled nursing studies appropriate to the subject were included.

Exclusion Criteria

Participants	–
Interventions	Those without any intervention program
Comparison group	Those without any comparison group

Table 1. Keywords used during the search

Population	–
Intervention	"Animal assisted therapy" OR "animal assisted therapies" OR "pet therapy" OR "pet therapies" AND "nursing"
Comparison	"Intervention groups for whom animal assisted intervention was made" and "control groups"
Outcomes	–
Study design	Randomized controlled studies
Outcomes	Those with no results on animal-assisted practice
Study design	Studies on animal-assisted practices which were not randomized controlled studies and those whose researchers did not include a nurse

Selection of the Studies

The MESH terms were identified, and the titles, abstracts and keywords related to the MESH terms were searched. The articles accessed in the databases included in the present study were transferred to the EndNote x7 program. The duplicated studies were excluded, and the articles' titles and abstracts were analyzed. Figure 1 shows the PRISMA flow chart of the characteristics of the studies included in this review.

Assessment of the Risk of Bias

The risk of bias of the studies included in the systematic review was assessed based on the Cochrane Risk of Bias Assessment criteria. Based on those criteria, the studies' risk of bias was assessed at three levels: low (+), unclear (?), and high (-) (Higgins et al., 2011) (Table 2). Based on the randomization methods employed by the studies, the risk of bias was assessed to be low in four studies and unclear in two studies; high risk of bias was not found in any studies. Hiding the randomization information was assessed to be a low risk of bias in four studies, an unclear risk of bias in one study, and a high risk of bias in one study. The risk of bias in terms of blinding the participants and personnel was assessed to be low in two studies and unclear in four studies, while high risk of bias was not found in any studies. Blinding of the result assessment and bias of loss were assessed to be a low risk in all studies. Bias of reporting was assessed to be a low risk five studies and an unclear risk in one study. In terms of other types of bias, the risk of bias was assessed to be low in two studies, unclear in two studies, and high in two studies (Table 2). The risk of bias of the studies included in this review was assessed by all researchers independently and categorized by consensus.

Data Analysis

In this review, the findings of the studies, including the study type, methodology, participants, data analysis method, inter-
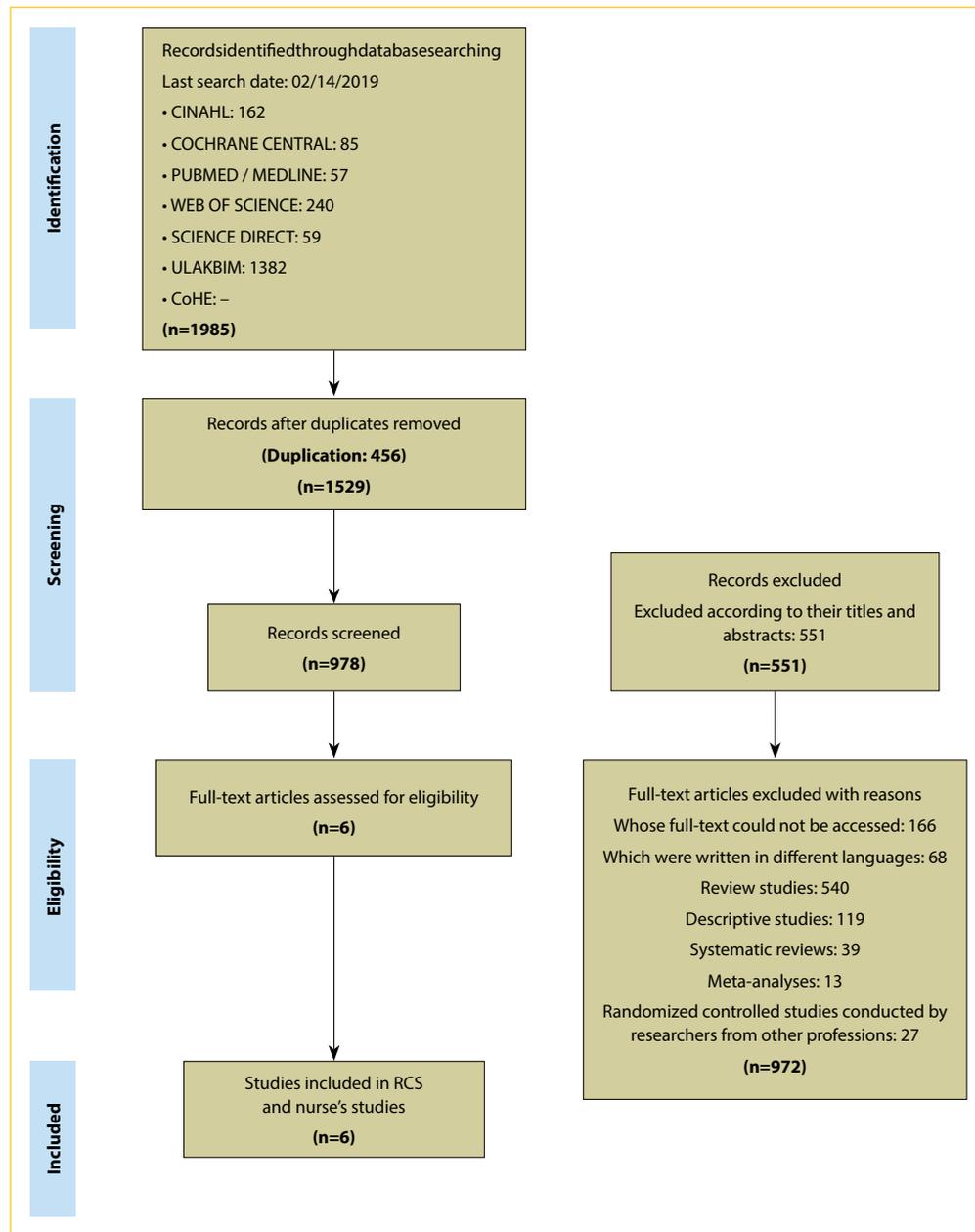
Figure 1. The characteristics of the studies included in this review, the PRISMA flow chart.

vention programs, and intervention results, were categorized and presented in a table. The findings section presents detailed data regarding the studies included in this review based on the inclusion criteria.

Ethical Considerations

The literature review does not pose any risk of causing a material or nonmaterial damage to the researchers. The studies analyzed in this review are shown in the references.

Results

The findings of this study are presented under six subtitles:

study characteristics, practice method, the animal used, the place of the practice, the measurement tools used to assess the results of the practice, and the results of the studies (Table 3).

Findings on the Characteristics of the Included Studies

In this systematic review, 1,985 studies were accessed through a literature review. After the use of the EndNote x7 program and the manual check, 456 duplicate studies were excluded, and 1,529 studies were left. Upon reviewing the titles and abstracts, 551 studies were excluded from this review, as their subjects were not appropriate for this review. The full text of the remaining 978 studies was analyzed. Of these, the following were excluded: 166 full-text documents could not be ac-

Table 2. Assessment of the risk of bias

	Randomization type (selection bias)	Hiding the randomization information (selection bias)	Blinding the the personnel (performance bias)	Blinding in the assessment of the results (determination bias)	Incomplete result data (loss bias)	Selective reporting (reporting bias)	Other biases
Havey et al., 2014	?	+	+	+	+	+	–
Stefanini et al., 2015	+	+	?	+	+	+	+
Valenti Soler et al., 2015	+	+	+	+	+	+	?
Olsen et al., 2016	?	+	?	+	+	+	–
Petersen et al., 2016	+	–	?	+	+	?	+
Sollami et al., 2017	+	?	?	+	+	+	?

+: Low risk; ?: Unclear risk; –: High risk.

cessed, 68 were in different languages, 540 were conducted as reviews, 119 were descriptive in design, 39 were systematic reviews, 13 were meta-analyses, and 27 were conducted by researchers from other professions. The remaining six RCSs were included in the present systematic review. The results of these six studies are categorized in Table 3. The studies were conducted in 2014 and later in the United States of America (2), Italy (2), France (1), and Norway (1). The studies carried out the practices in nursing homes, day care centers and hospitals, using live and robotic animals during the intervention programs. They used different measurement tools to evaluate the effectiveness of the intervention.

Characteristics of the Practice Groups

The studies used the AAPs for individuals diagnosed with dementia, those with a mental disorder, elderly people,[18,28,30] children and adolescents,[31] and post-op patients with a hip or knee prosthesis through total joint replacement surgical operation.[32] The studies were conducted with individuals who were presented to a psychiatric hospital due to a cognitive impairment[18,28,30] or acute mental disorders[31] and post-op patients.[32] The samples of the studies were assessed based on age and developmental period found to consist of adults,[18,32] elderly,[28–30] and children and adolescents.[31]

Findings on the Practice Method and the Animals Used

Five of the studies[28–32] made comparisons with a control group for whom no interventions were made, and only one study[18] used live animals, NAO and PARO were used together in the intervention and control group. The studies used live animals (dog)[29–32] or the PARO, a Food and Drug Administration (FDA)-approved biofeedback tool,[28] during the intervention. All of the studies were structured with different procedures based on their aims and sample groups. One of the studies[32] compared the effectiveness of the intervention with another study conducted by Kaplan and Ludwig-Beymer (2004), which used AAPs. In the study by Kaplan and Ludwig-Beymer[33] (2004), the patients were visited with dogs and were allowed to inter - act with the animal within the scope of the AAP intervention. Havey et al.[32] (2014) compared the outcomes of the patients for whom the AAP was or was not carried out, finding that the rate of using analgesics and anesthetic painkillers was re - duced among the patients after the AAPs.

In the studies, the AAP interventions were carried out using different procedures based on the characteristics of the sam - ple and the aim of the intervention. Living,[18,29–32] humanoid (NAO)[18] or robotic (PARO)[18,28] animals were used in these interventions,[18,28,32] and a planned and purposeful AAP was carried out.[30,31] The interventions were carried out continu - ously[18,28–31] or at intervals;[32] the intervention duration ranged from three to six months;[18,28–32] two to three sessions were held during the intervention, and the duration of each session ranged between 20 to 60 minutes (Table 2).[18,28–32]

Table 3. Characteristics of the analyzed studies

Article	Study type	Sample characteristics	Place of practice	Animal used	Measurement tools used	Content of the practice	Results
Havey et al., 2014 The effect of animal-assisted therapy on pain medication use after joint replacement	Retrospective randomized controlled study	Control Group: Patients receiving treatment in a hospital without an AAP program (n=46) Intervention Group: Patients receiving treatment in a hospital with an AAP program (n=46)	Two hospitals where AAP is and is not carried out	Live animal (dog)	Morphine Equivalent Daily Dose Conversion (MEDD) values	*The study compared the results of the study by Kaplan/Ludwig-Beymer (2004), who made an AAP intervention 10 years ago, and the painkiller amounts used by individuals in another hospital which did not carry out AAPs in the same period. In the study by Kaplan and Ludwig-Beymer (2004), the patients were visited with live animals (dogs) and were allowed to interact with the animal within the scope of the AAP intervention. *Havey et al. (2014) assessed the use of painkillers by the patients on the post-op second day using a retrospective patient chart and compared them with the rate of using painkillers by the patients in the control group. *The painkillers administered to the patients in both groups were compared upon being converted to their intravenous morphine equivalents using the conversion rates in the current literature. (morphine equivalent daily dose conversion: MEDD)	*The rate of using painkillers significantly reduced in the intervention groups, and then considerably decreased in the following days. *Patients who attended three or more AAP visits needed to use painkillers less. *The patient group who attended more AAP visits tended to receive lower doses of MEDD.
Stefanini et al., 2015 The use of animal-assisted therapy in adolescents with acute mental disorders: A randomized control study.	Randomized controlled study	Intervention group: adolescents with acute mental disorders (n=17) Control Group: Adolescents who continued to receive routine care and did not receive any AAP program (n=17)	Child and adolescent psychiatric hospital	Live animal (dog)	Children's Global Assessment Scale (CGAS)	*A 16-session AAP program was carried out with the intervention group for one hour twice a week, for a total of six months, using four live animals (dogs).	It is reported that the AAP *increased the self-esteem, *developed social interaction, *increased the rate of school attendance and quality of life, and *increased the willingness to meet the daily needs and reduced the need of receiving care in the intervention group.
ValentiSoler et al., 2015 Social robots in advanced dementia	Randomized controlled study	Conducted with dementia patients NAO (n=33 in the first stage, n=0 in the second stage) PARO (n=33 in the first stage, n=42 in the second stage) live dog (n=0 in the first stage, n=36 in the second stage) control group (n=38 in the first stage, n=42 in the second stage)	Nursing home	NAO Pet robot (PARO) and live animal (dog)	Global Deterioration Scale (GDS) Neuropsychiatric Inventory (NPI) Severe Mini-Mental State Examination (sMMSE) Mini-Mental State Examination (MMSE) Dementia Nursing Home version (APADEM-NH) Apathy Inventory (AI) Apathy Scale for Institutionalized Patients Quality of Life Scale (QUALID)	*The interventions were carried out for the intervention group in two 3-month periods; and the total study duration was 15 months. *The interventions were carried out through 30- to 40-minute sessions twice a week for three months. *The effectiveness of the animal-assisted practices carried out with NAOs, PAROs and live animals (dog) was compared with each other and with control groups.	It is reported that the AAP *reduced agitation and *improved apathy and quality of life in the intervention group.

Table 3. Characteristics of the analyzed studies *(continue)*

Article	Study type	Sample characteristics	Place of practice	Animal used	Measurement tools used	Content of the practice	Results
Olsen et al., 2016 Effect of animal-assisted activity on balanced and quality of life in home-dwelling persons with dementia.	Randomized controlled study	Intervention Group Elderly people for whom AAP was carried out (n=28) Control Group: Elderly people who continued to receive routine care and did not receive any AAP program (n=30)	Elderly day care centers	Live animal (dog)	Berg Balance Scale	*This multi-center study was conducted in 10 care centers with live animals (dogs). *In the study, 30-minute AAP sessions were carried out twice a week for 12 weeks by an educated implementer with groups of three to six participants.	*The AAP has significant positive effects on balance. *The AAP is indicated to be a multifactor intervention in providing care to individuals with dementia. *It may have positive clinic effects reducing the risk of fall of individuals with dementia. *The AAP is highlighted to positively affect the level of depression and quality of life.
Petersen et al., 2016 The utilization of robotic pets in dementia care. Journal of Alzheimer's disease	Randomized controlled study	Intervention Group Individuals aged 65 and older diagnosed with dementia for whom AAP intervention was made (n=35) Control Group: Individuals aged 65 and older diagnosed with dementia for whom no AAP intervention was made (n=26)	Healthcare centers	Pet robot (PARO)	Vital signs Galvanic Skin Response Test (GSR) Berg Balance Scale Global Deterioration Scale (GDS) Rating Anxiety in Dementia (RAID) Cornell Scale for Depression in Dementia (CSDD)	*For the intervention group, 20-minute intervention sessions were carried out three times a week for the first three months using pet robots (PARO). *During these sessions, six participants sit around a round table with the PARO on the middle. *Thus, the participants were made to interact with the PARO. *The galvanic skin response, pulse oximetry, and pulse rate were recorded in each session for three months.	It is reported that the AAP: *supported the treatment of the symptoms such as stress, depression, and anxiety, *reduced skin reactions, *increased oxygen saturation, *reduced the need for using analgesic and psychoactive drugs, and *changed the vital signs positively in the intervention group.
Sollami et al., 2017 Pet therapy: An effective strategy to care for the elderly? An experimental study in a nursing home. Acta Biomed for Health Professions.	Randomized controlled study	Intervention Group: Elderly individuals in nursing home for whom AAP program was carried out (n=14) Control Group: Elderly individuals in nursing home for whom no AAP program was carried out (n=14)	Nursing home	Live animal (dog)	Global Deterioration Scale (GDS) Hamilton Anxiety Rating Scale (HAM-A) Apathy Evaluation Scale (AES) UCLA Loneliness Scale Quality of Life Scale (QUALID)	*The AAP intervention was carried out for the intervention group in 45- to 60-minute individual and group sessions for three months using a live animal (dog).	It is reported that the AAP: *reduced the perception of distress, depression, anxiety, and apathy, *supported the treatment of psychiatric disorders, and *increased social interactions in the intervention group.

Findings on the Place of the Practice

The studies were conducted in healthcare centers and hospitals,[28–32] nursing homes,[18,30] day care centers,[29] and a child and adolescent psychiatric hospital.[31]

Findings on the Measurement Tools Used to Assess the Effectiveness of the AAP

The studies used different measurement tools to assess whether the AAPs cause physiological, neurological or psychosocial changes according to the study subject and the measured parameters. In the studies, in addition to the scales used to determine the individuals' need for analgesic and anesthetic-type painkillers,[32] and to assess the physiological symptoms such as their vital signs and stress or anxiety levels,[28] scales for the assessment of individuals' balance[29] and risk of fall[28,29] were used. It was found that the measurement tools used to assess neurological findings differed by the sample groups' developmental periods, and in the studies included in this review, in addition to the scales rating the severity of the disease in children[31] and the elderly,[18,28,30] scales assessing symptoms such as perception or memory in elderly patients[18] were used. In addition to the scales for the assessment of the existence of mental disorders such as anxiety[28,30] and depression,[28] scales assessing individuals' symptoms such as dementia[28] and apathy,[18,30] loneliness,[30] and quality of life perception[18,29,30] were used.

Findings on the Results of the AAPs

The study results indicated that the AAPs reduce individuals' stress levels[28,30] and use of analgesics,[28–32] regulate their vital signs,[28] reduce depressive moods and agitated behaviors,[18,29] increase individuals' self-esteem, social interaction, and quality of life[18,29,31] as well as children's school attendance rate,[31] and serve as an additional support to the other treatments for mental disorders, such as depression and anxiety.[28,30]

Discussion

This systematic review analyzed six randomized, controlled studies which used AAPs as nursing interventions to contribute to the literature on this subject. The results of the studies included in this review indicated that the AAPs contribute to individuals' physical and mental healing although their study groups, methods, and durations were different. The studies used AAPs for the individuals diagnosed with dementia or mental disorder and for elderly people,[18,28–30] children, and adolescents,[31] as well as for the post-op patients who received a hip or knee prosthesis through total joint replacement surgical operation.[32] The AAPs were used for different age groups and patient groups. Particularly, the results of the studies conducted with individuals with mental disorders are remarkable in the literature. AAPs are observed to be used for individuals with mental disorders such as schizophrenia,[34]

individuals showing aggressive behaviors,[13] individuals with mild or moderate autism within the scope of the treatment and care of psychiatric disorders,[14] individuals with substance use disorder,[35,36] and children who experience trauma.[37–38] In addition, some studies indicate that AAPs are also used for post-op patients[40] and patients who underwent organ transplantation.[41] The AAPs were used for different age groups. They were used for children with behavioral disorders, low academic success, low self-esteem, who experience problems adapting to school, and whose social relationships are poor or not developed.[12] Some studies show that AAPs are also used for elderly individuals.[42,43] Analysis of the study groups of the studies included in this review, in which AAPs were carried out by nurses, showed that AAPs were used for all age groups, from children to the elderly with dementia and mental problems, or who have difficulty in communication. The results of these studies suggest that AAPs can be used in nursing care and practices for various age and diagnosis groups.

It was found that the AAPs were carried out by nurses through different procedures depending on the characteristics of the sample and the aim of the intervention.[18,28–32] In the studies included in this review, the duration of the intervention ranged between three and six months; two to three sessions were held within the scope of the AAPs, and the duration of each session ranged from 20 to 60 minutes. In the literature, the duration of the AAP sessions mostly lasted for 20 to 30 minutes,[12,15,40,42] with the minimum duration being 10 minutes[44] and the maximum duration being two hours,[43] and the total duration of the intervention being four weeks minimum[45] and 12 months maximum.[43] In the studies, it was ensured that individuals were engaged in purposeful and planned activities by interacting with animals within the scope of AAP.[46] The variety of the practice methods and procedures may be attributed to the study samples with different characteristics, different study aims, and the different animals used in the study.

The studies in which AAPs were carried out used live, plush, or robotic animals. In the present review, almost all nurses used live animals in the AAPs and preferred dogs as the live animal;[29–32] one study used the PARO, an FDA-approved biofeedback tool,[28] and one study used a live animal, NAO, and PARO together. In the literature, it is reported that various live, plush[13,47,56] and robotic[19] animals, such as cats,[43,47–50] rabbits,[51–53] elephants,[54] fish, dolphins, goats, insects,[55] birds,[42] and Guinea pigs,[12] were used in the AAPs. The literature also shows that in addition to live animals, NAOs and PAROs were used in the AAPs.[18,19,28,57] The reasons for robotic animals being preferred in the AAPs instead of live animals include the following: people are afraid of live animals; humans may develop allergic reactions to the animals and vice versa; the animals may become agitated; and caring for live animals is both costly and difficult.[28] In addition, the ability of robotic animals to interact with humans through their sensors, respond to stimulants such as sounds and movements,

and repeat the commands given to them, and the fact that they do not have any known adverse effects, may facilitate their use in AAP interventions.[18] Selection of the appropriate animal based on the characteristics of the group for whom the AAP will be used may be important for the effectiveness of the intervention; thus, it is important to select the animals carefully

It was found that nurses carried out the AAP in different institutions and organizations, such as healthcare centers and hospitals,[28–32] nursing homes,[18,30] day care centers,[29] and child and adolescent psychiatric hospitals.[31] In the literature, AAPs have been carried out by researchers from other professions in schools,[12] prisons, detention homes,[13] disabled care and rehabilitation centers,[29,38] and animal-assisted therapy centers,[58] in addition to the institutions indicated above. Studies conducted by nurses were mostly carried out for the individuals who directly received medical treatment in healthcare institutions. It is considered important that the use of the AAPs by nurses in the care of vulnerable individuals in various institutions such as detention homes be made widespread and supported with study results.

It is seen that different measurement tools were used based on the characteristics and qualifications of the study assessing the effectiveness of the AAPs. The studies included in this review used scales that assess mental symptoms such as quality of life, depression, anxiety, and loneliness, as well as those that assess physical symptoms, such as pain level. The literature includes studies that assess both qualitative[44,59–62] and quantitative[4,43,53] data to assess the results of AAPs. In the quantitative studies, the Stress Symptoms Inventory, the Quality of Life Assessment Scale, and the Depression, Anxiety, Trait Anxiety, and Pain scales were used as appropriate to the study content. In addition, some studies also performed objective test methods, such as cortisol levels in saliva[40,45,63] and EEG status.[40] In addition, Silva and Osorio[42] (2018) used the "Animal-assisted Therapy Assessment Questionnaire" to assess the effect of this practice in their study. The fact that the various measurement tools used in the studies include different parameters may be attributed to the fact that the AAP was effective in alleviating or eliminating both physical and mental symptoms.[45]

The results of the nursing studies that used AAPs indicate that the practice was effective in the elimination or reduction of many physical and psychological symptoms. The studies included in this review indicated that the AAPs reduce individuals' stress levels[28,30] and use of analgesics,[28–32] regulate their vital signs,[28] reduce depressive moods and agitated behaviors,[18,29] increase individuals' self-esteem, social interaction, and quality of life[18,29,31] as well as children's school attendance rate,[31] and serve as an additional support to the other treatments for mental disorders, such as depression and anxiety.[28,30] The literature highlights that AAPs have many psychological, emotional, social and physical results which are beneficial. Studies indicate that the presence of animals facilitated individuals' expression of their emotions and improved their communication, self-care, and self-confidence.[12–14] The use of AAPs is widespread in the management of the symptoms of mental disorders. Studies have shown that AAPs reduce aggressive behaviors,[13] anxiety, and stress levels;[15,64] facilitate coping with the sense of loneliness and improve the perception of health;[64,65] and have positive effects for individuals with attachment issues.[66] The AAPs have also been observed to affect physiological symptoms. The study results in the literature indicate that individuals' immune systems were strengthened,[17] the cardiovascular system was regulated,[64] their need for painkillers were reduced after surgery, and their motivation for treatment increased when AAPs were carried out for them.[44] There are also studies which show the effectiveness of AAPs on children, as well as various age groups. The AAPs were found to increase the willingness of children, who had problems in school attendance, to attend the school,[12] as well as increasing their adaptation to physical and cognitive changes in the problems observed due to developmental periods.[16] The results of all studies indicate that the AAPs are effective and applicable as a nursing intervention.

Limitations of This Systematic Review

A limitation of this systematic review was that only the studies in seven databases were searched. This review was also limited to six studies included in the sample. The methodological differences, such as the forms and scales, sample size and the participants, and the type and interpretation of the relevant variables constitute an important limitation.

Conclusion

The results of this systematic review indicated that AAPs, which are indicated as a nursing intervention in the NIC, are carried out with different patient groups within the scope of different procedures and constitute a very effective intervention method. Nurses can carry out the AAPs as a member of the team or as a completely independent nursing intervention. The use of AAPs is current but limited around the world. In Turkey, although descriptive studies have recently been carried out on the applicability of AAPs in nursing studies, no randomized controlled studies have been found yet. The AAPs can be carried out with different animals, in different periods of time, and based on different procedures, depending on the sample. The literature shows that the AAPs have many benefits and can be carried out by nurses too. In this regard, it can be concluded that the AAP is an effective method. It is considered important that nurses, who have important roles and responsibilities in the care and treatment of different groups, such as the elderly, disabled, children, or adults, use AAPs actively in nursing care. It is recommended that nurses be informed about the procedures of AAPs, training be provided on the practice, the effectiveness of the AAPs be supported for dif-

ferent patient groups with RCSs, and the use of the AAPs be made widespread in nursing care and practice.

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References

1. Erdoğan S. Standart ve ortak dil kullanmak hemşireliğin geleceği için fırsat mı? İÜFNHYO Hemşirelik Dergisi 2003;50:1–13.
2. Ay F. Uluslararası alanda kullanılan hemşirelik tanıları ve uygulamaları sınıflandırma sistemleri. Turkiye Klinikleri Med Scİ 2008;28:555–61.
3. Korkmaz Aslan G, Emiroğlu ON. Hemşireliğin görünürlüğünü artırmak için standardize ve kodlu bir sınıflama sisteminin kullanılması, klinik bakım sınıflama sistemi. Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Hemşirelik Dergisi 2012;69–79.
4. Nursing Interventions Classification (NIC), 4th edition; Intervention Labels & Definitions 1. N=514 Retrieved January 1, 2019, from http://www.seapaonline.org/uploads/documentacion/Metodolog%C3%ADa%20Enfermera/labeldefinitions-NIC.pdf.
5. Matuszek S. Animal-facilitated therapy in various patient populations: systematic literature review. Holist Nurs Pract 2010;24:187–203.
6. Bulechek GM, Butcher HK, Dochterman JM, Wagner C. Hemşirelik Girişimleri Sınıflaması (NIC). In: Erdemir F, Kav S, Akman Yılmaz A, (Translation Eeditors). 6th ed. İstanbul: Nobel Tıp Kitabevleri; 2013.
7. Macauley BL. Animal-assisted therapy for persons with aphasia: A pilot study. J Rehabil Res Dev 2006;43:357–66.
8. İncazlı SB, ÖzerS, Yıldırım Y. Rehabilitasyon hemşireliğinde hayvan destekli uygulamalar. Balıkesir Sağlık Bilimleri Dergisi 2016;5:88–93.
9. Jorgenson J. Therapeutic use of companion animals in health care. Image J Nurs Sch 1997;29:249–54.
10. Ormerod EJ, Edney AT, Foster SJ, Whyham MC. Therapeutic applications of the human-companion animal bond. Vet Rec 2005;157:689–91.
11. Morrison ML. Health Benefits of Animal-Assisted Interventions. Complementary Health Practice Review 2007;12:51–62.
12. O'Haire ME, McKenzie SJ, McCune S, Slaughter V. Effects of classroom animal-assisted activities on social functioning in children with autism spectrum disorder. J Altern Complement Med 2014;20:162–8.
13. Ballarini G. Pet Therapy animals in human therapy. Acta Bio Medica 2003;74;97–100.
14. Elmacı DT, Cevizci S. Dog-assisted therapies and activities in rehabilitation of children with cerebral palsy and physi-cal and mental disabilities. Int J Environ Res Public Health 2015;12:5046–60.
15. West B. Effects of animal-assisted therapy on self-perceived and physiological stress. [Unpublished Master Thesis]. Vienna: Webster Vienna Private University; 2018.
16. Cowel DR. A Clinical practice change initiative to incorporate Animal Assisted Therapy in advanced practice registered nurses' clinical practice for children and adolescents. [Unpublished Doctoral Thesis]. Hattiesburg: University of Southern Mississippi; 2017.
17. Charnetski CJ, Riggers S, Brennan FX. Effect of petting a dog on immune system function. Psychol Rep 2004;95:1087–91.
18. Valentí Soler M, Agüera-Ortiz L, Olazarán Rodríguez J, Mendoza Rebolledo C, Pérez Muñoz A, Rodríguez Pérez I, et al. Social robots in advanced dementia. Front Aging Neurosci 2015;7:133.
19. Bharatharaj J, Huang L, Al-Jumaily A, Krägeloh C, Mohan ER. Investigating the effects of Robot-Assisted Therapy among Children with autism spectrum disorder using bio-markers. IOP Conference Series: Materials Science and Engineering 2017;1–7.
20. Offical Journal of ANA. Unleash the Healing Power of Pet Therapy. Retrieved December 22, 2019, from https://www.americannursetoday.com/unleash-the-healing-power-of-pet-therapy/.
21. Buettner LL, Fitzsimmons S, Barba B. Animal-assisted therapy for clients with dementia. J Gerontol Nurs 2011;37:10–4.
22. Bardill N, Hutchinson S. Animal-assisted therapy with hospitalized adolescents. J Child Adolesc Psychiatr Nurs 1997;10:17–24.
23. Edwards NE, Beck AM. Animal-assisted therapy and Nutrition in Alzheimer's disease. West J Nurs Res 2002;24:697–712.
24. Cole KM, Gawlinski A, Steers N, Kotlerman J. Animal-assisted therapy in patients hospitalized with heart failure. Am J Crit Care 2007;16:575–85.
25. Hemşirelik Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmelik (19 Nisan 2011). Resmi Gazete; Sayı:27910. Retrieved from https://www.resmigazete.gov.tr/eskiler/2011/04/20110419-5.htm.
26. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, et al; PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 2015;4:1.
27. Higgins JP, Altman DG, Gøtzsche PC, Jüni P, Moher D, Oxman AD, et al; Cochrane Bias Methods Group; Cochrane Statistical Methods Group. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. BMJ 2011;343:d5928.
28. Petersen S, Houston S, Qin H, Tague C, Studley J. The Utilization of Robotic Pets in Dementia Care. J Alzheimers Dis 2017;55:569–74.
29. Olsen C, Pedersen I, Bergland A, Enders-Slegers MJ, Ihlebæk C. Effect of animal-assisted activity on balance and quality of life in home-dwelling persons with dementia. Geriatr Nurs 2016;37:284–91.
30. Sollami A, Gianferrari E, Alfieri M, Artioli G, Taffurelli C. Pet ther-

apy: an effective strategy to care for the elderly? An experimental study in a nursing home. Acta Biomed 2017;88:25–31.

31. Stefanini MC, Martino A, Allori P, Galeotti F, Tani F. The use of Animal-Assisted Therapy in adolescents with acute mental disorders: A randomized controlled study. Complement Ther Clin Pract 2015;21:42–6.

32. Havey J, Vlasses FR, Vlasses PH, Ludwig-Beymer P, Hackbarth D. The Effect of Animal-Assisted Therapy on pain medication use after joint replacement. Anthrozoös 2014;27:361–9.

33. Kaplan P, Ludwig Beymer P. The impact of animal assisted therapy (AAT) on the use of pain medications after a surgical procedure in an acute care hospital. Poster Presented at Annual Edward Hospital Nursing Grand Rounds. Naperville: 2004.

34. Moyle W, Beattie E, Draper B, Shum D, Thalib L, Jones C, et al. Effect of an interactive therapeutic robotic animal on engagement, mood states, agitation and psychotropic drug use in people with dementia: a cluster-randomised controlled trial protocol. BMJ Open 2015;5:e009097.

35. Wesley MC,Minatrea NB, Watson, JC.Animal Assisted Therapy in thetreatment of substance dependence, Anthrozoös 2009;22:137–48.

36. Coetzee N, Beukes JT, Lynch I. Substanceabuseinpatients' experience of Animal-Assisted Therapy. Journal of Psychology in Africa 2013;23:477–80.

37. Reichert E. Individual counseling for sexually abused children: A role for animals and storytelling. Child and Adolescent Social Work Journal 1998;15:177–85.

38. Parish-Plass N. Animal-assisted therapy with children suffering from insecure attachment due to abuse and neglect: a method to lower the risk of intergenerational transmission of abuse? Clin Child Psychol Psychiatry 2008;13:7–30.

39. Dietz TJ, Davis D, Pennings J. Evaluating animal-assisted therapy in group treatment for child sexual abuse. J Child Sex Abus 2012;21:665–83.

40. Calcaterra V, Veggiotti P, Palestrini C, De Giorgis V, Raschetti R, Tumminelli M, et al. Post-operative benefits of animal-assisted therapy in pediatric surgery: a randomised study. PLoS One 2015;10:e0125813.

41. Holleman K, Holland T, West L, Snyder LD. The positive out comes for patients receiving Animal Assisted Therapy after lung transplantation. Journal of Heart and Lung Transplantation 2016;35:S 342.

42. Silva NB, Osório FL. Impact of an animal-assisted therapy programme on physiological and psychosocial variables of paediatric oncology patients. PLoS One 2018;13:e0194731.

43. Caprilli S, Messeri A. Animal-Assisted Activity at A. Meyer Children's Hospital: A Pilot Study. Evid Based Complement Alternat Med 2006;3:379–83.

44. İchitani T, Cunha C. Effects of animal-assisted activity on self-reported feelings of pain in hospitalized children and adolescents. Psicologia: Reflexao Critica 2016;29:1–10.

45. Barker SB, Knisely JS, McCain NL, Schubert CM, Pandurangi A. Exploratory Study of Stress-Buffering Response Patterns from Interaction with a Therapy Dog. Anthrozoös 2010;23:79–91.

46. Pope WS, Hunt C, Ellison K. Animal assisted therapy for elderly residents of a skilled nursing facility. Journal of Nursing Education and Practice 2016;6:56–62.

47. Libin A, Cohen-Mansfield J. Therapeutic robocat for nursing home residents with dementia: preliminary inquiry. Am J Alzheimers Dis Other Demen 2004;19:111–6.

48. Stasi MF, Amati D, Costa C, Resta D, Senepa G, Scarafioiti C, et al M. Pet-therapy: a trial for institutionalized frail elderly patients. Arch Gerontol Geriatr Suppl 2004;:407–12.

49. Goleman M, Drozd L, Karpinski M, Czyzowski P. Cat therapy as an alternative form of animal-assisted therapy. MedycynaWeterynaryjna 2012;68:732–5.

50. Boyer VE, Mundschenk N. Using Animal-Assisted Therapy to facilitate social communication: A pilot study. Canadian Journal of Speech-Language Pathology and Audiology 2014;38:26–38.

51. Loukaki K, Koukoutsakis P, Kostomitsopoulos N. Animal welfare issues on theuse of rabbits in an animal assisted therapy program for children. Journal of the Hellenic Veterinary Medical Society 2010;61:220–5.

52. Burgon H. Case studies of adults receiving horse-riding therapy. Anthrozoös 2003;16:263–276.

53. Lanning BA, Baier ME, Ivey-Hatz J, Krenek N, Tubbs JD. Effects of equine assisted activities on autism spectrum disorder. J Autism Dev Disord 2014;44:1897–907.

54. Satiansukpong N, Pongsaksri M, Sung US, Vittayakorn S. Thai elephant-assisted therapy program: the feasibility in assisting an individual with autism. WFOT Bulletin 2008;58:17–26.

55. Ko HJ, Youn CH, Kim SH, Kim SY. Effect of Pet Insects on the Psychological Health of Community-Dwelling Elderly People: A Single-Blinded, Randomized, Controlled Trial. Gerontology 2016;62:200–9.

56. Berget B, Ihlebaek C. Animal-Assisted Interventions; Effects on human mental health - a theoretical framework. Psychiatric Disorders - Worldwide Advances 2011;121–38.

57. Melson GF, Kahn PH, Beck A, Friedman B. Robotic Pets in human lives: Implications for the human–animal bondand for human relationships with personified technologies. Journal of The Social İssues 2009;65:545–67.

58. Pérez-Camargo G, Creagan ET. The design of visitation facilities to engage patients with their own cats and dogs. Complement Ther Clin Pract 2018;31:193–9.

59. Swall A, Ebbeskog B, Lundh Hagelin C, Fagerberg I. 'Bringing respite in the burden of illness' - dog handlers' experience of visiting older persons with dementia together with a therapy dog. J Clin Nurs 2016;25:2223–31.

60. Swall A, Ebbeskog B, Lundh Hagelin C, Fagerberg I. Stepping out of the shadows of Alzheimer's disease: a phenomenological hermeneutic study of older people with Alzheimer's disease caring for a therapy dog. Int J Qual Stud Health Well-being 2017;12:1347013.

61. DumanN. Koruyucu ve destekleyici önlem olarak çocukların mağdur olarak bulunduğu davalarda hayvanların kullanımı. Research Studies Anatoia Journal 2018;1:368–75.

62. Kaya H, Bektaş M.Çalışan. Bireylerin Evcil Hayvanlara Bağlanma Nedenlerine İlişkin Nitel Bir Çalışma. Mediterranean Jour-

nal of Humanities 2019;2:401–17.

63. Nepps P, Stewart C, Bruckno SR. Animal-Assisted Therapy: Effects on stress, mood, and pain. The Journal of Lancaster General Hospital 2011;6:56–9.

64. McCullough A, Ruehrdanz A, Jenkins MA, Gilmer MJ, et al. Measuring the effects of an animal assisted intervention for pediatric oncology patients and their parents: A multisite randomized controlled trial. Journal of Pediatric Oncology Nursing 2018;35:159–77.

65. Pamuk D. Yaşlı bireylerin yaşamında evcil hayvanların rolü. Mediterranean Journal of Humanities 2015;2:297–306.

66. Beetz A, Julius H, Turner D, Kotrschal K. Effects of social support by a dog on stress modulation in male children with insecure attachment. Front Psychol 2012;3:352.