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REVIEW

ANIMAL THERAPY AS A NURSING INTERVENTION FOR PAIN MANAGEMENT: A SYSTEMATIC REVIEW

TERAPIA COM ANIMAIS COMO INTERVENÇÃO DE ENFERMAGEM PARA MANEJO DA DOR: REVISÃO SISTEMÁTICA

TERAPIA CON ANIMALES COMO INTERVENCIÓN DE ENFERMERÍA PARA EL MANEJO DEL DOLOR: REVISIÓN SISTEMÁTICA

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ABSTRACT

Objective: to analyze the available evidence on using animal-assisted therapy in Nursing for pain management. **Method:** a systematic review of 15 sources of information was conducted. Randomized clinical trials that used animal-assisted therapy for pain management in any population, in different healthcare settings, or others, as long as they had therapeutic purposes, were included. Studies that used animal-assisted therapy in combination with other intervention methods were also included. Control studies included standard treatment or other non-pharmacological interventions for pain management. There were no restrictions regarding sex, age, or ethnic origin. Theses, dissertations, editorials, and studies with incomplete data were excluded. Two researchers independently conducted the search and data extraction. Due to the diversity of the studies, only qualitative data analysis was performed. The risk of bias was assessed based on the Cochrane Collaboration Risk of Bias. **Results:** twelve articles were included in the analysis, and the treatment protocol was not standardized. Moreover, 16.67% of the studies presented a high risk of bias, 50.00% showed some concerns, and 33.33% had a low risk. Although the majority of the studies (75%) reported positive results for pain management, due to the diversity of the studies, it was not possible to assert the effect of the intervention on this variable. **Conclusion:** although most of the studies obtained satisfactory results, insufficient evidence supports or refutes the use of animal-assisted therapy in Nursing for pain management. The results highlight the need for standardized and detailed studies in this relatively new area of Nursing.

Keywords: Systematic Review; Pain; Animal-Assisted Therapy; Nursing.

RESUMO

Objetivo: *analisar as evidências disponíveis sobre o uso da Terapia com Animais na Enfermagem para o manejo da dor.* ***Método:*** *revisão sistemática de 15 fontes de informação. Foram incluídos ensaios clínicos randomizados que utilizaram a Terapia com Animais para o manejo da dor em qualquer população, em diferentes ambientes de saúde ou outros, desde que tivessem finalidades terapêuticas. Também foram incluídos estudos que usaram a Terapia com Animais em combinação com outros métodos de intervenção. Os estudos de controle incluíam o tratamento padrão ou outras intervenções não farmacológicas para o manejo da dor. Não houve restrições quanto a sexo, idade ou origem étnica. Teses, dissertações, editoriais e estudos com dados incompletos foram excluídos. Dois pesquisadores realizaram a busca e extração de dados de forma independente. Devido à diversidade dos estudos, foi realizada apenas análise qualitativa dos dados. O risco de viés foi avaliado com base na Cochrane Collaboration Risk of Bias.* ***Resultados****: foram incluídos 12 artigos na análise. Não houve padronização do protocolo de tratamento. 16,67% dos estudos apresentaram alto risco de viés, 50,00% mostraram algumas preocupações e 33,33% tiveram baixo risco. Embora a maioria dos estudos (75%) tenham relatado resultados positivos para o manejo da dor, devido à diversidade dos estudos, não foi possível afirmar o efeito da intervenção nessa variável.* ***Conclusão:*** *embora a maioria dos estudos tenha obtido resultados satisfatórios, não há evidências suficientes para apoiar ou refutar o uso da Terapia com Animais na Enfermagem para o manejo da dor. Os achados do estudo destacam a necessidade de realização de estudos padronizados e detalhados nessa área relativamente nova da Enfermagem.*

Palavras-chave*: Revisão Sistemática; Dor; Terapia Assistida com Animais; Enfermagem.*

RESUMEN

Objetivo: *analizar las evidencias disponibles en la literatura sobre la utilización de la Terapia con Animales, como intervención de enfermería, en el manejo del dolor.* ***Método:*** *revisión sistemática realizada en 15 fuentes de información. Se incluyeron ensayos clínicos aleatorizados que emplearon la Terapia con Animales para el manejo de cualquier tipo de dolor, en cualquier población, realizados en diferentes niveles de atención sanitaria u otros entornos, siempre que tuvieran objetivos terapéuticos; estudios que emplearon la Terapia con Animales como intervención con cualquier tipo de animal utilizado de forma individual o en combinación con otros métodos; estudios en los que el grupo de control incluía tratamiento de rutina estándar u otras intervenciones no farmacológicas para el manejo del dolor. No se establecieron límites en cuanto al sexo, edad o origen étnico. Se excluyeron tesis, disertaciones, editoriales y estudios con datos incompletos. El proceso de búsqueda de información y extracción de datos fue realizado por dos investigadores de forma independiente. Debido a la alta heterogeneidad de los estudios, solo se realizó un análisis cualitativo de los datos. La evaluación del riesgo de sesgo se basó en la Cochrane Collaboration Risk of Bias.* ***Resultados:*** *se incluyeron 12 artículos en el análisis descriptivo. No hubo estandarización en el protocolo de tratamiento. El 16,67% de los estudios presentaron un alto riesgo de sesgo, el 50,00% algunas preocupaciones y el 33,33% bajo riesgo.*

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A pesar de que la mayoría de los estudios (75%) presentaron resultados positivos en relación al manejo del dolor, debido a las heterogeneidades clínicas y metodológicas de los mismos, no fue posible afirmar el efecto de la intervención sobre esta variable. ***Conclusión:*** *aunque la mayoría de los estudios individuales presentaron resultados satisfactorios, no hay evidencia para apoyar o refutar la utilización de la Terapia con Animales en el manejo del dolor como intervención de enfermería. Los hallazgos del presente estudio contribuyen al avance científico al explorar un área de la enfermería relativamente reciente, y la escasez de publicaciones centradas en esta temática señala la necesidad de llevar a cabo estudios estandarizados y detallados.*

Palabras clave: *Revisión Sistemática; Dolor; Terapia Asistida por Animales, Enfermería.*

INTRODUCTION

Pain, whether acute, chronic, neuropathic, nociplastic or nociceptive[1], is a vital component of the body's survival systems[2]. It is a complex condition that, when intensified, triggers various physiological and behavioral responses, negatively impacting an individual's quality of life[3]. To adequately assess and treat pain, non-pharmacological therapeutic resources complementing drug treatment are necessary, as the latter is most commonly used in this context[4]. The Nursing Interventions Classification (NIC) recommends animal-assisted therapy (AAT) as a therapeutic approach[5].

Animal-assisted therapy is characterized as the "intentional use of animals to provide affection, attention, entertainment, and relaxation"[5]. It is garnering interest from professionals and researchers as a non-pharmacological strategy for managing pain, particularly in children, due to its potential for improving physical, social, emotional, and cognitive function[4]. However, the application of AAT in clinical practice remains controversial due to insufficient evidence with adequate methodological rigor[4,6]. Moreover, current research varies considerably in terms of gender, age group, and ethnic origin[4]. It is worth noting that studies on pain management, with no limits on types of pain or population characteristics, remain scarce.

It is essential to review studies that have explored the use of AAT in pain management without restrictions on age, gender, ethnic origin, or type of pain. This will help validate this non-pharmacological Nursing intervention as a method of pain control. It is noteworthy that this intervention was proposed by the NIC in 1992 and revised in 2000[5]. Since then, there have been no updates, underlining the need to examine recent findings in this area in the scientific literature.

The question brought forth is: what effect does AAT, as a Nursing intervention, have on pain management in individuals with pain, compared to standard treatment (i.e., medication) or other non-pharmacological interventions (e.g., physiotherapy, integrative, and complementary health practices, occupational therapy, social interaction, health education)? Thus, this study aims to scrutinize the evidence available in the literature regarding the use of AAT as a Nursing intervention in pain management.

METHOD

A systematic review was conducted according to Cochrane recommendations[7] and reported according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA, 2021)[8]. This review was registered in the Prospective Register of Systematic Reviews (registration: CRD42021269685). The research question was formulated using the PICO approach (P: Population, I: Intervention, C: Comparison, O: Outcomes)[9]: What is the effect of AAT (intervention) on the management of any type of pain (outcomes) in individuals experiencing pain (population), compared to standard medication treatment or other non-pharmacological interventions like physiotherapy, integrative and complementary health practices, occupational therapy, social interaction, and health education (comparison)?

Studies were sought in September 2021 and updated in June 2023 using databases such as MEDLINE via PubMed, PubMed Central, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), World Health Organization International Clinical Trials Registry Platform, ClinicalTrials.gov, Virtual Health Library, Traditional, Complementary and Integrative Medicine (TCIM Americas), Web of Science, Scopus, and Physiotherapy Evidence Database. Language restrictions were not imposed. Abstracts and full articles for each selected article were gathered, and the citation search was conducted based on the references of the included articles, published research reports, and preprint articles. Studies not published and/or indexed that were identified through Google Scholar, ClinicalTrials.gov, the Brazilian Registry of Clinical Trials, and the Brazilian Library of Theses and Dissertations were also evaluated.

The search strategy was crafted by two authors with input from a health search strategy-experienced librarian. Indexed descriptors, free-text search terms, and keywords were employed, and terms were combined with the Boolean operators OR and AND as follows: ("Animal-assisted therapy" OR "Animal-assisted therapies" OR "Animal-Facilitated Therapy" OR "Animal-Facilitated Therapies" OR "Animal-assisted intervention" OR "Animal-assisted

interventions" OR "Animal-Assisted Therapy" OR "Animal-facilitated therapy" OR "Animal-assisted intervention" OR "Animal-assisted intervention") AND (pain OR "pain management" OR "Pain control" OR "Pain relief" OR ache OR aches OR "Acute pain" OR "Chronic pain"). The search strategy adapted for each source of information is accessible as supplementary material on SciELO Data®.

Eligibility criteria for article selection included: 1) randomized clinical trials utilizing AAT to manage any kind of pain (acute, chronic, neuropathic, nociplastic, or nociceptive)[1] in any population, administered across health care levels (primary, secondary, tertiary) or other settings with therapeutic purposes, regardless of gender, age group, or ethnic origin; 2) studies implementing AAT as an intervention alone or in conjunction with other methods, with any animal type (dogs, cats, horses, snakes, turtles, rodents, guinea pigs, birds, etc.)[4]; 3) studies where the control group involved standard treatment (medication) or other non-pharmacological interventions for pain management, such as physiotherapy, integrative and complementary health practices, occupational therapy, social interaction, and health education.

Excluded were theses, dissertations, editorials, and studies with incomplete data that did not answer the guiding research question. Observational studies' and reviews' reference lists were checked to identify other potentially eligible studies. Database search results were uploaded to EndNote® to eliminate duplicate studies and then exported to Rayyan® for title and abstract selection, with blind cooperation between reviewers.

Article selection occurred in two stages. In the first stage, two independent reviewers read titles and abstracts from each database based on eligibility criteria, resulting in a 78% agreement rate; a third researcher resolved disagreements. In the second stage, pre-selected articles were thoroughly read by two independent reviewers to confirm their match with the eligibility criteria — this resulted in an 88.5% agreement rate. Again, any disagreements were addressed by a third researcher.

A data extraction form was adapted for this review based on the evaluation model proposed by the Cochrane Handbook for Systematic Reviews of Interventions[7]. The form included the following sections[10]: source; keywords; objectives and hypotheses; eligibility criteria and clinical condition of participants; study setting; design and group allocation; AAT – professional tasked with carrying out the intervention, animal used with justification for the choice, frequency of sessions, duration of each session, duration of the complete treatment, authorizations to use the animal in the health service; control group: type (no treatment, standard treatment, other non-pharmacological interventions for pain management, such as physiotherapy, integrative and complementary health practices, occupational therapy, social interaction, health education) and description of the intervention; primary outcome; other outcomes: main results; main conclusions.

Two independent researchers completed this form, adhering to each selected study's authorship and design stipulations. Any discrepancies identified were resolved through researcher discussions, with arbitration provided by a third researcher when necessary.

The risk of bias assessment followed the Cochrane Collaboration Risk of Bias – ROB 2.0 guidelines[11]. It was conducted independently by two researchers using the Rob2 Excel software (beta version 9). This tool is tailored to the study design (parallel group randomized trials, cluster randomized trials, and randomized crossover trials) and encompasses five bias-assessing domains: 1) bias linked to the randomization process; 2) bias from deviation in intended interventions; 3) bias from missing outcome data; 4) bias from outcome measures; 5) bias in the selection of the reported outcome[11]. Each domain contains a set of algorithm-based questions that determine the risk of bias, which could be low or high or yield some concerns[11].

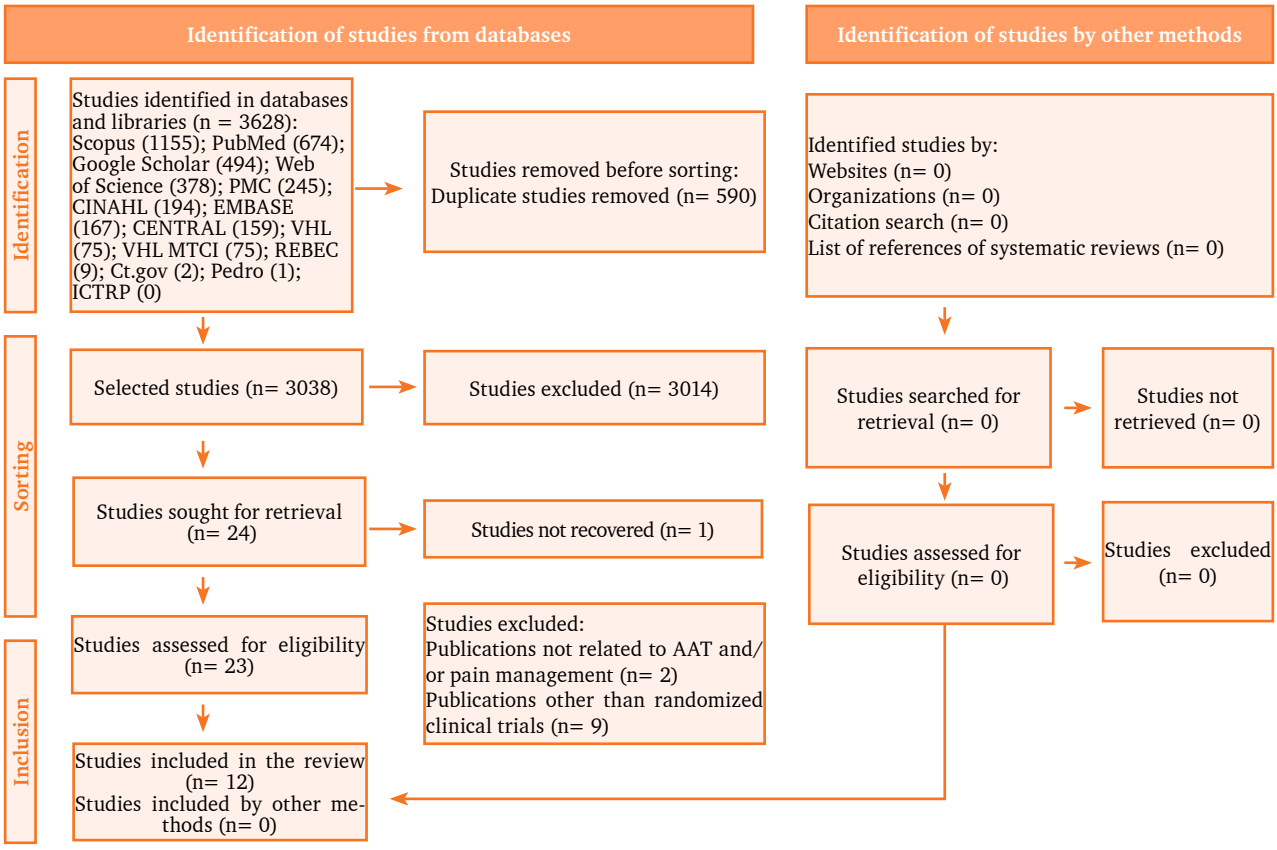
Considering the heterogeneity of the included studies, a qualitative data synthesis was undertaken[12]. This process included data reduction, data display, data comparison, conclusion drawing, and verification. The data was first summarized descriptively, compared, and then categorized. The key information was displayed in tables to provide detailed insights in an efficient, easy-to-view format, with supplementary narrative information provided where necessary.

RESULTS

A total of 3,628 studies were found in the electronic and manual searches, and 12 were included in the review (Figure 1).

All the articles were published in English between 2015 and 2022 in the United States (n= 6, 50%)[13-18], Italy (n= 3, 25%)[19-21], Germany (n= 1, 8.34%)[22], Spain (n= 1, 8.34%)[23], and Canada (n= 1, 8.34%)[24]. Table 1 shows information on the interventions applied in the different groups (intervention and control), summary statistics on pain intensity (assessed on a scale of zero to 10)

Figure 1 - Study selection flowchart, Viçosa, MG, Brazil, 2023



Source: adapted from PRISMA[8].

for each group at the start and end of treatment, and the main findings in relation to pain intensity.

A total of 1,024 participants, aged between three and 90, were involved in the studies, with 755 being female (71.00%). Additionally, 515 were allocated to the experimental group receiving AAT, and 522 to the control groups receiving standard or other treatments. All of the randomized clinical trials carried out were parallel, two--arm types. Regarding the randomization process, six studies (50.00%) utilized a draw-from-the-hat method with participants' names on pieces of paper[19], or software/computers[15-17,21-22]. Block randomization was employed in two studies (16.67%)[18,20]. Conversely, two studies (16.67%) reported that patients were randomly sorted into groups based on the order of their inclusion in the study[23], or their volunteer status[14]. In a separate study (8.33%), randomization was ensured by alternating the days therapy dog teams visited the service[24]. Lastly, one study (8.33%) chose not to randomly assign participants to groups[13]; in this case, the experimental group included children owning pets, while the control group was made up of children harboring fears or allergies to dogs[13].

Regarding allocation concealment, one study (8.33%) used sealed opaque envelopes to conceal the generated random sequence[20], while another ensured allocation concealment through permuted blocks of variable size in addition to opaque envelopes[22]. The remaining ten studies (83.33%) did not provide this information[13-19,23-24].

As for blinding, three studies (25%) ensured the examiners were blinded[16,18,22], and participants were blinded in two studies (16.67%)[18,24]. Five studies (41.67%) were categorized as open[13,15,19-21,23], with three studies (25%) failing to provide this information[14,17,21]. In terms of intervention, the team received training for the intervention in healthcare settings in two studies (16.67%)[17,19]. Another study reported that the health protocol was prepared in line with the recommendations from the Guidelines for Environmental Infection Control in Health Care Facilities, Centers for Disease Control and Prevention, and the Advisory Committee on Infection Control Practices in Health Care[21].

Certain studies involving horses took place in centers with equine therapy experience, following the regulations set by the German Therapeutic Riding Consortium[22] or

certified riding stables by Therapeutic Horsemanship International[18]. The rest were performed in healthcare centers[13-17,19-21,23-24]. Two studies (16.67%) did not mention healthcare approvals for therapeutic animal use[13,23], while five studies (41.67%) stated that the animals were registered/certified for therapy by regulating bodies[14-17,24].

Notably, dog-assisted intervention was the most prevalent method (n=10; 83.33%)[13-17,19-21,23-24], followed by horse-assisted therapy (n= 2; 16.67%)[18-22]. Table 2 lists the AAT intervention protocols.

In regard to pain assessment, three studies (25.00%) addressed chronic pain conditions[14,18,23], while six studies (50.00%) focused on acute conditions[13,15-16,20-21,24]. However, only two studies (16.67%) explicitly detailed the temporality of pain[14,23]. It should be noted that in three studies (25.00%), the pain characteristics could not be inferred due to insufficient information[17,19,22]. Pain measurement was primarily conducted using numerical/visual analog scales (n= 10; 83.33%)[13-16,18-19,21-24], face scales (n= 2; 16.67%)[20-21], or multidimensional instruments (n= 2; 16.67%)[17,23]. Figure 2 presents the individual assessment of study bias risk.

Table 1 - Characterization of studies regarding the intervention applied and main findings, Viçosa, MG, Brazil, 2023 (n = 12)

Author, Year, Country	Objectives	Intervention in the EG	Intervention in the CG	Summary statistics for each pain intensity group	Main findings related to pain intensity
Barker et al.[13], 2015/ United States	To investigate the effect of 10 minutes of AAI on anxiety and pain in pediatric patients in an intensive care hospital.	AAI with dog (n= 10)	Puzzle activity (n= 10)	EG: Baseline: μ: 5.5 (sd: 1.8) Post-treatment: μ: 5.2 (sd: 3.2) CG: Baseline: μ: 5.6 (sd: 2.2) Post-treatment: μ: 4.9 (sd: 1.4) p-value between groups at post-treatment: 0.970	There were no significant differences in pain intensity
Clark et al.[14], 2020/ United States	To study the physiological and emotional impact of an AAA session on patients with fibromyalgia.	Session with handler and therapy dog (n= 108)	Session with the driver (conversation on previously approved topics (n= 108)	EG: Baseline: μ: 5.6 (sd: 1.6) Post-treatment: μ: 5.0 (sd: 1.6) CG: Baseline: μ: 5.5 (sd: 1.7) Post-treatment: μ: 5.2 (sd: 1.6) p-value (group-time interaction): 0.006	Pain scores were significantly lower in each group after the 20-minute session; however, the treatment group had a greater reduction in pain
Harper et al.[15], 2015/United States	To evaluate the role of AAT, using therapy dogs, in the immediate post-operative period of hip and knee arthroplasty	AT with dog and ST (physiotherapy) (n= 36)	TP (physiotherapy) (n= 36)	EG: Baseline: μ: 5.2 (sd: 1.5) Post-treatment: μ: 1.7 (sd: 0.9) CG†: Baseline: μ: 7.1 (sd: 1.3) Post-treatment: μ: 4.1 (sd: 1.0) p-value between groups at post-treatment: < 0.001	The use of therapy dogs has a positive effect on patients' pain levels
Kline et al.[16], 2019/ United States	To test whether therapy dogs reduce anxiety in emergency department patients	AAT with dog (n= 40)	ST (n= 40)	Median and interquartile range shown for SG (p-value = 0.0008) and CG. p-value > 0.05 for time-group interaction	Exposure to the therapy dog and trainer significantly reduced pain scores

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Table 1 - Characterization of studies regarding the intervention applied and main findings, Viçosa, MG, Brazil, 2023 (n= 12)

Author, Year, Country	Objectives	Intervention in the EG	Intervention in the CG	Summary statistics for each pain intensity group	Main findings related to pain intensity
Thompkins et al.[17], 2019/United States	To investigate the effects of occupational therapy on affect, pain, and stress in individuals undergoing occupational therapy during rehabilitation from traumatic spinal cord injury	AAT with a dog and OT (occupational therapy sessions) (n= 16)	OT (occupational therapy sessions) (n= 15)	EG: Baseline: μ: 5.6 (sd: 1.2) Post-treatment: μ: 4.9 (sd: 1.8) CG: Baseline: μ: 5.9 (sd: 3.1) Post-treatment: μ: 5.8 (sd: 3.5) p-value between groups at post-treatment: 0.370	The study was insufficient and the impact of AAT was not statistically significant on pain intensity
White-Lewis et al.[18], 2019/United States	Comparing AAT with horses to exercise education on pain, range of motion, and quality of life in adults and elderly people with arthritis	AAT with horses (n= 10)	Educational exercises for the care and management of joint pain and mobility (n= 10)	EG: Baseline: μ: 41.1 (sd: 30.0) Post-treatment: μ: 14.8 (sd: 18.5) p-value: 0.006 CG: Baseline: μ: 39.0 (sd: 28.6) Post-treatment: μ: 29.6 (sd: 20.9) p-value: 1.000 p-value between groups at post-treatment: 0.021	AAT with horses reduced pain in adults and elderly people with arthritis
Ambrosi et al.[19], 2018/ Italy	To identify whether the presence of the dog caused changes in the psychopathological picture; to determine in which dimensions of depressive and anxiety disorders these changes occurred; and to evaluate the patients' sense of empowerment and control over their perceived sense of illness and their spontaneous verbal and non-verbal communication	AAT with dogs (n= 17)	ST || (pharmacological and voluntary participation in social activities) (n = 17)	EG: Mean difference between baseline and post-treatment: -0.3 (sd: 1.4) CG: Mean difference between baseline and post-treatment: -0.0 (sd: 1.7) p-value between groups: 0.40	The reduction in pain levels was small and not significant
Calcaterra et al.[20], 2015/ Italy	To understand the effects of an AAT program on neurological, cardiovascular, and endocrinological responses to stress and pain in the immediate post-operative period in children undergoing surgical procedures	Presence of dog during post-operative awakening (n= 20)	ST (post-operative care) (n= 20)	EG: Post-treatment: Intensity 0 - n = 18 Intensity 2 - n = 2 Intensity 4 - n = 0 Intensity 6 - n = 0 CG: Post-treatment: Intensity 0 - n = 9 Intensity 2 - n = 7 Intensity 4 - n = 3 Intensity 6 - n = 1	AAT modifies the perception of pain
Vagnoli et al.[21], 2015/ Italy	Investigate the effectiveness of using AAI as a distraction to reduce pain and suffering in children before, during and after blood collection	AAI with dog and presence of parents during the procedure (n= 25)	Presence of parents during the procedure (n= 25)	EG: Post-treatment: μ: 4.7 (sd: 3.8) CG: Post-treatment: μ: 5.1 (sd: 2.9) p-value between groups at post-treatment: 0.77	The presence of dogs during venipuncture reduced painful suffering in children
Vermohlen et al.[22], 2017/ Germany	To assess whether equine therapy plus ST is superior to ST alone in maintaining balance and other relevant outcomes in patients with multiple sclerosis	AAT with horses and ST (drug treatment, immunotherapy and physiotherapy) (n= 22)	ST (pharmacological treatment, immunotherapy and physiotherapy) (n= 19)	EG: Mean difference between baseline and post-treatment: -7.4 (SD: 16.8) CG: Mean difference between baseline and post-treatment: -1.3 (sd: 28.0) p-value between groups: 0.555	Pain measured by the visual analog scale was lower in the intervention group than in the control group but similar after 12 weeks

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Tabela 1 – Caracterização dos estudos quanto à intervenção aplicada e principais achados, Viçosa, MG, Brasil, 2023 (n= 12)

Author, Year, Country	Objectives	Intervention in the EG	Intervention in the CG	Summary statistics for each pain intensity group	Main findings related to pain intensity
Rodrigo-Claverol et al.[23], 2019/Spain	To evaluate the effectiveness of AAT in a geriatric population with chronic joint pain, in terms of reducing chronic pain, the use of analgesics and improving quality of life	AAT with dog and ST (kinesiotherapy) (n= 30)	ST (kinesiotherapy) (n= 22)	EG: Baseline: μ: 8.8 (sd: 3.6) Post-treatment: μ: 4.7 (sd: 2.9) p-value: < 0.001 CG: Baseline: μ: 7.8 (sd: 1.8) Post-treatment: μ: 5.2 (sd: 2.7) p-value: < 0.001	AAT reduced the perception of pain in individuals with higher baseline severity
Carey et al.[24], 2022/Canada	To evaluate the change in symptoms and physiological variables in an AAT team visit with a dog compared to no visit in patients with pain	AAT with dog and ST (n= 107)	ST‡‡ (n= 104)	EG: Mean difference between baseline and post-treatment: 0.9 (sd: 2.0), p-value = 0.004 CG: Baseline: Post-treatment: Mean difference between baseline and post-treatment: -0.03 (sd: 2.3), p-value = not significant (no value)	The results suggest a beneficial impact of AAT and signal significant differences between pre- and post-intervention for the intervention group compared to the control, as far as pain is concerned

EG = Experimental group; CG = control group; μ = mean; sd = standard deviation; AAI = animal-assisted intervention; n = number of participants; AAA = animal-assisted activity; AAT = animal-assisted therapy; ST = standard treatment.

Table 2 - Animal therapy intervention protocol in the experimental group. Viçosa, MG, Brazil, 2023 (n= 12)

Author, Year	Professionals involved in the intervention	Animal used	Sessions/visits			Duration of full treatment	Care of the animal for the intervention
			n	Frequency	Duration		
Barker et al.[13], 2015	Volunteers, members of the hospital's dog therapy program with previous experience in pediatric visits	Dogs (various sizes, both sexes - Labrador Retriever, Shetland Sheepdog, Jack Russell terrier, Maltese and 3 mixed-breed dogs)	1	Not reported	10 minutes	10 minutes	Not reported
Clark et al.[14], 2020	Trainer	19 therapy dogs that were part of the Mayo Clinic's Caring Canine Program, at least 1 year old (13 females and 6 males)	1	Not reported	20 minutes	20 minutes	The dogs were up to date with their vaccinations, were considered healthy by the vet, at least 1 year old, and were not fed a raw diet. All the dogs were spayed or neutered.
Harper et al.[15], 2015	Trainer and Nursing team	5-year-old curly-haired retriever dog	4	Twice a day	15 minutes	2 days	Not reported
Kline et al.[16], 2019	Trainer, Nursing staff, assistants, and doctors	17 therapy dogs	1	Not reported	15 minutes		The dogs remained on a 1.5-meter-long leash, held by the handler throughout the meeting
Thompkins et al.[17], 2019	Trainer and Occupational Therapist	6 male and female dogs (Golden Retriever, Terrier Mix, Havanese, Labrador Retriever, Sheltie and mixed breed)	1	Once a day	30 minutes	15 minutes	Not reported

Continue...

...continuation.

Table 2 - Animal therapy intervention protocol in the experimental group. Viçosa, MG, Brazil, 2023 (n= 12)

Author, Year	Professionals involved in the intervention	Animal used	Sessions/visits			Duration of full treatment	Care of the animal for the intervention
			n	Frequency	Duration		
White-Lewis et al.[18], 2019	Trainer, Nurse, Physiotherapist and Occupational Therapist	Horses	4	Once a day	60 minutes	4 days	The horses were certified by PATH* and chosen for their calm temperament, combined with the riders' height, weight, and range of abduction at the hip joint. The trainer and nurse were present at all times to ensure the safety of the animal and the rider
Ambrosi et al.[19], 2018	Dog trainer, volunteer health observer, veterinary surgeon and clinical psychologist.	Dogs (5 Golden Retrievers and 1 Flat-coated Retriever)	6	Once a week	30 minutes	6 weeks	The dogs have been professionally trained and have passed the certification aptitude tests for therapy dogs. What's more, all the criteria of the Ministry of Health's guidelines for AAI and animal welfare were met
Calcaterra et al.[20], 2015	Trainer	Dog (7-year-old Golden Retriever)	10	Once a week	20 minutes	10 weeks	The dog was vaccinated, bathed regularly, screened for enteric pathogens and treated for internal and external parasites on a monthly basis. The dog's well-being was monitored by a veterinarian
Vagnoli et al.[21], 2015	AAI Specialist†, Doctor, and Nurse	4 Dogs (1 female Labrador, 1 male mongrel and 2 small mongrels)	1	Not reported	15 minutes	20 minutes	All the dogs were behaviorally trained and carefully examined by a veterinarian
Vermohlen et al[22], 2017	Not reported	Horse	1	Once a week	Not reported	15 minutes	Not reported
Rodrigo-Claverol et al.[23], 2019	Nurse, physiotherapist, and doctor with AAT training	3 therapy dogs (a 4-year-old male Golden Retriever and two 3-year-old Cavalier King Charles)	12	Once a week	60 minutes	12 weeks	The dogs belonged to a non-profit association dedicated to the AAI
Carey et al.[24], 2022	Trainer, research assistants, graduate or undergraduate students	Cães de terapia	12	Not reported	10 minutes	12 weeks	Hygienic grooming and supplementary guidelines to ensure the dog's health and well-being

PATH = Professional Association of Therapeutic Horsemanship International; AAI = animal-assisted intervention; AAT = animal-assisted therapy

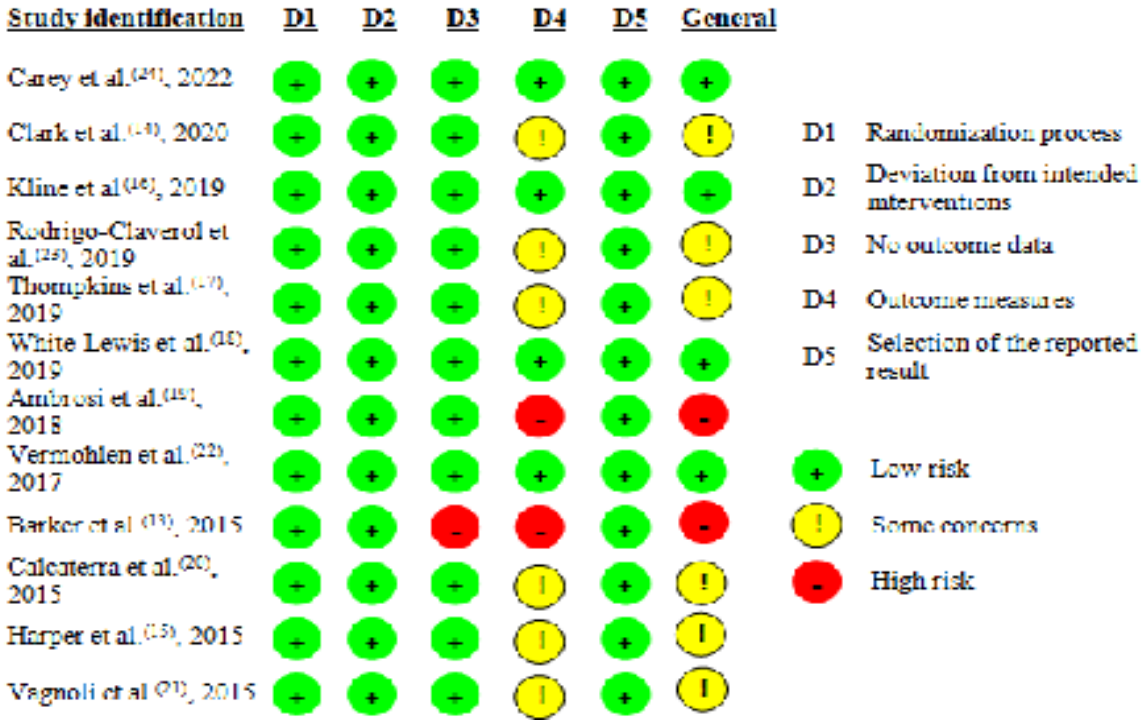
DISCUSSION

This study provides a synthesis of the evidence pertaining to pain management as facilitated by AAT as a Nursing intervention. Unfortunately, a lack of standardization within the treatment protocol rendered a meta-analysis impossible to execute, thus leading to the inability to conclusively determine the impact of this intervention on alleviating pain. As such, implementing this intervention in clinical Nursing practice is not currently recommended. To obtain a more comprehensive understanding, it is evident that we require a set of standardized and rigorous studies.

In terms of methodological heterogeneity, it is important to underscore the disparities in study design, outcome evaluation, and the execution of interventions. Study design limitations arose from factors such as small sample sizes, participant selection bias, the absence of blinding, and potential interference triggered by pharmacotherapy. These elements contribute to the impossibility of making generalizations and call into question the transparency of assessing bias risk, thus impacting the quality of the systematic review[25]. Moreover, differentiation in gender, age groups, and types of pain across studies presented a roadblock in carrying out statistical comparisons.

One notable factor across most studies pertains to the allocation of participants. Many studies did not provide a clear explanation of their allocation concealment methods, potentially leading to information bias and influencing results. Most studies implemented

Figure 2 - Assessment of the risk of bias carried out using the RoB 2 software. Viçosa, MG, Brazil, 2023. (n= 12)



Source: generated using the ROB2 Excel software® (Beta Version 9)

randomization, which positively contributes to sample homogeneity. However, the analysis of the results did not sufficiently detail pain characteristics, such as temporality, frequency, causes, and qualitative and quantitative descriptors.

A recent study assessed the impact of AAT with horses on pain relief and discovered a reduction in pain levels correlated with increased intervention[26]. There were accounts of decreased usage of analgesic medication. This analgesic effect could potentially be attributed to the social aspect[4,15,20], distraction offered by the animal[4,23], or the activation of neuroendocrine responses[4], such as the release of oxytocin. Its release is stimulated by interaction with the animal and modulates stress levels.

This effect is notably evident in stable relationships, such as with pets[27]. Consequently, it is recommended to facilitate interactions between individuals experiencing pain, particularly those with chronic pain, and their pets to decrease the use of medication and moderate pain and stress levels.

Another study conducted a randomized clinical trial to explore the analgesic effects of AAT in healthy participants[28]. Pain was intentionally produced and evaluated prior to, during, and after the intervention using the visual analog scale. The findings suggested that the mere presence of an animal had no analgesic effect. Nevertheless, the researchers posited that it is crucial to consider the context in which AAT is implemented and to establish relevance with respect to pain treatment through this intervention. They argued that it is vital to explain to the patient the objectives of AAT, illustrating how the presence of a dog can contribute to pain alleviation, possibly through physical interaction with the animal or by merely observing it, thereby potentially increasing oxytocin levels, an anti-inflammatory hormone[28].

Most studies included in this review used one-dimensional pain-measuring tools[13-15,18-24]. Multidimensional instruments that provide a more thorough pain examination, including characteristics, emotional and physical interference, and impact on quality of life[29], were less frequently used due to the extra time required for correct administration[20,29,30]. This choice of one-dimensional tools was predicated upon practicality, although it remains significant to promote the use of instruments that give a more comprehensive pain evaluation, thus enabling better pain management and a more thorough evaluation of the outcome.

Regarding the interventions, there was no consistency in the number of sessions, frequency, duration of

each session, and total duration of treatment, even when the same animal species was used. This discrepancy precluded a meta-analysis in this study. This diversity likely arose because of the varying contexts and clinical conditions in which AAT was implemented, pointing to an individualization of the treatment. Still, some studies did not provide complete information[13-14,16,20-22,24]. It is crucial to highlight that this data is not contained in the activities delineated in the NIC[5]. Clearly describing the number of sessions, frequency, and overall duration of treatment is crucial for the reproducibility of the intervention, a crucial factor for clinical studies and its application in clinical practice

A variety of interventions were utilized in the control group, such as distraction techniques like puzzles[13] and exercises[18]; alternative therapies such as kinesiotherapy[23] and occupational therapy[17], pharmaceutical treatment[19,22], the latter being the most commonly adopted in clinical practice[4]. It is evident that there is no consensus on the type of control to be utilized, making it challenging to compare studies and, therefore, to perform a meta-analysis and generate more rigorous evidence.

The majority of the studies included the presence of a trainer. It is surmised that the presence of a professional trainer is vital to maintaining the success of the intervention. Nonetheless, this activity is yet to be included in the NIC[5]. Other professionals involved included doctors, physiotherapists, occupational therapists, psychologists, veterinarians, and nurses. Nursing was mentioned in 50% of the studies[15-16,18,21,23-24], highlighting the importance of their participation in AAT interventions. Nursing training is based on a holistic, integrated perspective that considers humans as inseparable beings. This aligns with AAT, as this intervention facilitates comprehensive care and is a valuable intervention tool for these professionals. However, in some countries, including Brazil, AAT is yet to be properly regulated, facing bureaucratic obstacles beyond the profession[31]. This could elucidate the limited number of AAT publications from Brazil.

The animals utilized in the studies were dogs[12-17,19-21,23-24] and horses[18,22], most likely owing to their traits, such as ease of domestication, training, and control[31]. Dogs were more frequently used due to their interaction with humans and their relatively small size[31]. Horses were only included in two studies[18,22], probably because of the necessity of sizeable areas, like equestrian centers, and the associated increased risk, requiring extra caution in their usage[22].

In the studies that mentioned precautions regarding animal use in health services[14,18-21,23-24], it was noted that they had received specific training for therapeutic purposes. Temperament was also taken into consideration[18-19,21]. Other important factors included vaccination[14,20], feeding[14], and hygiene[20,24] of the animals participating in the studies. These steps are vital to prevent the transmission of zoonoses and parasites, thus ensuring the well-being of the animals and the safety of the patients[18,20,24].

In terms of bias risk, a majority of the reviewed publications raised concerns[14-15,20-21,23] or identified a considerable risk of bias[13,19] in the domain of outcome measurement. Such a predicament might have been brought on by the absence of masking, highlighting that the researchers or participants were cognizant of the interventions, thereby potentially influencing the results. A solitary inquiry[13] exhibited a high risk of bias concerning missing outcome data, which could lead to discrepancies in appraisal and compromise the robustness of the study. The methodological quality of AAT studies was also underscored in a recent systematic review[32], summarizing and evaluating the evidence pertaining to pain relief intervention in healthcare settings. This review concluded the necessity for more stringent AAT research, as existing scientific evidence is feeble and does not pave the way for a dependable conclusion on the efficacy of AAT in pain relief. It is worth noting that this review[32] confined the evidence search to merely three information sources. The current study, conversely, encompassed evidence on AAT usage for pain relief from 15 information sources, thereby providing a more comprehensive analysis. Despite this, both investigations identified a distinct weakness in this intervention type, impeding its therapeutic usage.

Regarding the limitations of this study, the impossibility of conducting a meta-analysis due to substantial variation in AAT application, pain types, outcome measurement, and control group differences is noteworthy. Examined studies exhibited high heterogeneity and low methodological quality. The reported variation in terms referring to AAT also deserves mention, though all conceivable variants were included in the search strategy to minimize this bias.

This study's findings contribute to scientific advancement by probing into a relatively nascent area of Nursing. The dearth of publications on this subject underscores the need for regularized, detailed studies. Moreover, these findings have implications for clinical Nursing practice, given the need for more scientific evidence to facilitate a safe and effective implementation of AAT.

It is imperative to conduct high methodological quality and homogeneity randomized clinical trials. The

use of multidimensional assessment tools or combining various instruments to more accurately quantify and qualify pain and its characteristics is important for strengthening AAT as a science. Additionally, measuring stress and inflammation markers as pain outcomes is suggested. Considering the long-term effects of AAT and its cost-effectiveness is also important.

CONCLUSION

Although the majority of studies included in this review yielded satisfactory results, no substantial evidence has been found to either support or refute the application of this animal-assisted therapy for pain management in Nursing. Considering the increasing accessibility of these interventions in healthcare settings, gaining a more comprehensive understanding of their effectiveness is critical.

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