

# Animal-assisted activity and pain sensation in hospitalized children and adolescents

*Atividade assistida por animais e sensação de dor em crianças e adolescentes hospitalizados*

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## ABSTRACT

**BACKGROUND AND OBJECTIVES:** The interest on Animal-Assisted Activity, Education and Therapy is growing in Brazil. Only in the last decade, Brazilian investigators have started scientific studies aiming at evaluating the effectiveness of Animal-Assisted Activity, Education and Therapy as from international literature references. The methodological option of developing this project in hospital environment comes to meet the increasing interest of such institutions in introducing animals during the hospitalization period of patients, especially children. The presence of animals seems to produce significant socioemotional benefits as adjuvant to clinical management of hospitalized patients. This study aimed at evaluating the effects of Animal-Assisted Activity on pain sensation of hospitalized children and adolescents.

**METHODS:** This is an intervention, quantitative and qualitative research. Participated in the study 17 patients aged as from 7 years, hospitalized in the Hospital Infantil Sabará, with pain complaints. Participant co-therapist dogs were Bruce (large size) and Sheep (small size). Pain numerical scale was applied before and after Animal-Assisted Activity, Education and Therapy.

**RESULTS:** There are evidences, in the studied population, that this activity was effective to decrease patients' self-referred pain, in addition to improving emotional aspects of hospitalization, confirming literature data on the subject.

**CONCLUSION:** There has been significant pain decrease after intervention with dogs, confirming some international studies carried out on the subject.

**Keywords:** Adolescent, Animal-assisted therapy, Hospitalization, Hospitalized children, Pain.

## RESUMO

**JUSTIFICATIVA E OBJETIVOS:** Cresce o interesse sobre Atividade, Educação e Terapia Assistida por Animais no Brasil. Somente na última década, pesquisadores brasileiros iniciaram investigações científicas com vistas a avaliar a efetividade do trabalho com Atividade, Educação e Terapia Assistida por Animais, a partir de referências da literatura internacional. A opção metodológica de desenvolver esse projeto em ambiente hospitalar vem ao encontro do interesse crescente dessas instituições em introduzir os animais durante o período de hospitalização dos pacientes, especialmente as crianças. A presença dos animais parece produzir benefícios sócioemocionais significativos como adjuvante ao tratamento clínico de pacientes hospitalizados. O objetivo deste estudo foi avaliar os efeitos da Atividade Assistida por Animais na sensação de dor em crianças e adolescentes hospitalizados.

**MÉTODOS:** Trata-se de pesquisa de intervenção, de natureza quantitativa e qualitativa. Participaram do estudo 17 pacientes a partir de 7 anos de idade, hospitalizados no setor de internação do Hospital Infantil Sabará, com queixa de dor. Os cães coterapeutas participantes foram Bruce (porte grande) e Sheep (porte pequeno). A escala numérica de dor foi aplicada antes e depois da Atividade, Educação e Terapia Assistida por Animais.

**RESULTADOS:** Na população estudada, há evidências de que a esta atividade demonstrou eficácia quanto à redução da dor autorreferida pelos pacientes, além de melhorar aspectos emocionais sobre a hospitalização, corroborando dados bibliográficos de pesquisas realizadas sobre o tema.

**CONCLUSÃO:** Houve diminuição significativa da sensação de dor após a intervenção com o cão, corroborando com alguns estudos internacionais já realizados sobre o tema.

**Descritores:** Adolescente, Criança hospitalizada, Dor, Hospitalização, Terapia assistida por animais.

## INTRODUCTION

This study addresses the effect of Animal-Assisted Intervention (AAI) and pain sensation, in the context of hospitalized children and adolescents. There is increasing interest on Animal-Assisted Activity, Education and Therapy (AAA, AAE and AAT) in Brazil. However, in some countries such as the United States, Canada and France, animals to help treating people have been already introduced some decades ago. The International Association of Human-Animal Interactions Organizations (IAHAIO) is responsible for supplying interna-

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tional leaderships in the advance of the man-animal interaction field, supporting studies, education and cooperation between its members and other organizations dedicated to the subject. It names and defines AAI as approach with oriented and structured objective which incorporates animals to human health, education and service areas, aiming at therapeutic benefits. It includes Animal-Assisted Therapy, Education and Activity<sup>1</sup> (Table 1).

**Table 1.** Definition of Animal-Assisted Intervention modalities<sup>1</sup>

Animal-Assisted Therapy: therapeutic oriented, structured and planned intervention with defined objectives and monitored by health area professionals.

Animal-Assisted Education: intervention with oriented, structured and planned objective and directly linked to education, always monitored by a professor and/or pedagogue<sup>1</sup>.

Animal-Assisted Activity: informal, however planned, intervention and visit, with educational, motivational and recreational objectives.

Considering that hospitalization is one of the most stressful events for children, generating high levels of anxiety and fear<sup>2</sup>, the development of this study in hospital environment comes to meet the increasing interest of such institutions in introducing animals during the hospitalization period, especially for children. The presence of animals may bring significant socio-emotional benefits as adjuvant to clinical treatment of hospitalized patients<sup>3</sup>.

There are few studies in this scenario articulating pain and AAI in hospitalized children and adolescents, all with results favoring the use of the technique<sup>4-8</sup>.

As from these considerations, the objective of this study was defined: to evaluate the effect of AAA on pain intensity of hospitalized children and adolescents.

## METHODS

This is an intervention and quantitative study carried out according to guidelines and rules regulating studies involving human beings of the National Health Council, resolution 196/96. Participated in the study only patients authorized by parents or tutors, according to signature of the Free and Informed Consent Term (FICT). The study was carried out in Hospital Infantil Sabará (HIS) in São Paulo/SP, reference center of pediatric assistance, in the hospitalization sector, during October 2014 to April 2015.

Sample was of convenience, participating in the study 17 hospitalized children/adolescents of both genders, aged as from 7 years (Table 2).

Inclusion criteria were children and adolescents hospitalized in the admission sector (individual rooms), with verbal expression capacity (which justified established age), with pain complaint associated to any baseline disease, accepting contact with dogs, physical status allowing interaction with animals, preserved cognition, awake and conscious, in conditions to answer the questionnaire and fill the scales (even if unable to leave the bed).

Exclusion criteria were patients admitted to isolation, with severe allergy to dogs' fur and saliva, severely immunocom-

**Table 2.** Patients' characterization

Patient	Age	Gender	ICD	Disease/symptom *
1	11y 01m	F	R 10	Abdominal pain
2	08y 11m	F	R 10	Abdominal pain
3	10y 08m	F	R 52	Acute pain
4	12y 04m	M	R 10	Abdominal pain
5	12y 06m	F	R 51	Headache
6	09y 11m	M	R 10	Abdominal pain
7	17y 04m	F	R 51	Headache
8	13y 04m	M	D 58	Hereditary spherocytosis
9	10y 04m	F	J 18	Unspecific Bronchopneumonia
10	14y 06m	M	J 03	Streptococcal tonsillitis
11	17y 04m	M	L 03	Fingers and toes cellulitis
12	07y 06m	M	R 10	Abdominal pain
13	11y 10m	F	R 10	Abdominal pain
14	13y 00m	F	R 10	Abdominal pain
15	14y 08m	F	M 30	Polyarteritis nodosa
16	08y 10m	M	A 90	Dengue
17	11y 01m	M	R 10	Abdominal pain

\* Based on ICD reported on medical charts.

promised, with fear of interacting with dogs and difficulty to orally communicate.

## Co-therapist animals

Participated in the study two co-therapist dogs, Bruce, an Old English sheepdog (large size), 8 years old, and Sheep, Shih-tzu (small size), 6 years old, both castrated. Both went through constant evaluations of behavior and health for their own safety and of the subjects. The number of dogs was established in two so that they could work in shifts, assuring animals' wellbeing during data collection period.

## Procedure

Para garantir a segurança durante a coleta de dados, foram seguidos alguns itens importantes de saúde e comportamento baseado em protocolos internacionais, a saber<sup>9</sup>:

To assure safety during data collection, some important health and behavior items based in international protocols were followed, namely<sup>9</sup>:

a) Hands hygiene:

- Hygiene of patient, escort and team hands before and after contact with the animal;
- Hygiene of investigator's hands before and after each intervention with patient;

b) Animal's temperament:

- Evaluation of animal's temperament and behavior, checking: reactions to unknown people; reaction to high sound and/or new stimulation; reaction to aggressive voice or threatening gestures; reaction to crowded places; reaction to vigorous and clumsy cuddles; reaction to strong embrace; reaction to other animals; ability to follow conductor's commands;
- Interrupt visits if the animal has fear or aggressiveness behavior.

## c) Animal health:

- Vaccination against rabies, V8 or V10, giardia, canine cough;
- Not allowing animal to visit and put it in observation for one week in case of: vomiting or diarrhea; urinary or fecal incontinence; cough or sneezing of unknown cause; open wound, otitis, skin infection and heat;
- Veterinary monitoring and evaluation performing fleas, ticks and parasites control, isolating and treating infested animals;
- Present routine exams specific for parasites.

## d) For visits:

- Brush animal's fur before the visit;
- Bath up to 24 hours before the visit;
- Cut animal's nails;
- Keep collars and guides clean and odorless;
- Not getting in contact with immunocompromised or isolated patients.

Co-therapist dogs were introduced in the HIS environment to be familiar with routine, noises and odors in general. Two weekly introductory visits were performed (one with each dog), lasting 30 minutes, during November 2014. A nurse in charge and cooperator has monitored this procedure to introduce the hospitalization sector and most adequate places for dogs circulation.

Two shifts were done per week, one with each dog, in pre-determined days. During the shift, supervisor nurse of the hospitalization sector would visit all floors evaluating patients with regard to pain complaints. After evaluation, those with some pain complaint at that moment were indicated. The use or not of analgesics was defined by hospital's pain protocol, according to patient's need and clinical status.

**Data collection protocol**

**Stage 1:** person responsible for the patient was invited by the investigator to leave the room to be explained about the procedure. After explanations and having been given the authorization, the investigator would enter the room without the dog.

**Stage 2:** application of the pain numerical scale with the following explanation: "in a scale from zero to 10, where zero means 'no pain' and 10 means 'maximum pain', tell me the number representing your pain right now".

**Stage 3:** AAA session lasting 5 to 10 minutes. Dog's guide was removed in all interventions considering: low complexity of patients; highly controlled environment with regard to noises and circulation of people or equipment; dogs well experienced with AAI, providing safety to all involved parties. Activities were spontaneously chosen by patients. The investigator has interfered the least in this activity, just answering questions which were always about the dogs.

**Stage 4:** reapplication of the pain scale at the end of the session, without the presence of the dog.

**Statistical analysis**

Data descriptive analysis was carried out by means of absolute and relative frequencies, central trend measures (mean and median) and dispersion (standard deviation, minimum and maximum).

For inferential analysis, first the adherence to normal curve was checked with paired outcome variable Kolmogorov-Smirnov test and since it has presented normality, paired Student *t* test was applied to evaluate pain scores before and after intervention. Unpaired Student *t* test was also applied to evaluate the difference between groups with regard to initial pain, to identify possible differences as compared to the beginning of the study.

Descriptive level of 5% ( $p < 0.05$ ) was adopted for statistical significance. Data were tabulated in Excel spreadsheet and analyzed by the program SPSS version 17.0 for Windows.

This project was approved by the Ethics Committee, PUC-SP under CAAE 31880314.4.0000.5482, in 04/08/2014.

**RESULTS**

Studied population characterization (17 patients) is shown in table 3.

**Table 3.** Number and percentage of hospitalized patients, according to demographic and clinical characteristics

Variables	Category	n	(%)
Gender	Female	9	(52.9)
	Male	8	(47.1)
Type of disease	Acute	15	(88.2)
	Chronic	2	(11.8)
Analgesics	No	9	(52.9)
	Yes	8	(47.1)
Receptivity	No <sup>#</sup>	1	(5.9)
	Yes	16	(94.1)
Disposition	No <sup>#</sup>	1	(5.9)
	Yes	16	(94.1)
Mobility	No	8	(47.1)
	Yes	9	(52.9)
Escort	Mother	13	(76.5)
	Father	2	(11.8)
	Grandfather/grandmother	1	(5.9)
	Uncle/Aunt	1	(5.9)
Total		17	(100.0)

<sup>#</sup> Patient has initially refused the presence of the dog, however has changed his mind and went through the whole protocol.

There has been balanced distribution of genders. Mean age was  $12.1 \pm 2.8$ , median 11.8, varying from 7.5 to 17.4 years of age.

Mean time between drug ingestion and AAA was 129.6 minutes ( $SD = 78.4$ ), median of 106.5 minutes, minimum of 53 and maximum of 266 minutes.

Most frequent AAA activities were: cuddling, chatting, giving snacks, playing, taking pictures, asking for obedience commands.

Among performed activities, 58.8% were performed with Bruce. For being a convenience sample, the number of visits of each dog was according to patients present during each shift.

As to interaction time, mean was  $7.2 \pm 1.2$  min, median 7, minimum value 5 and maximum of 10 minutes.

**Table 4.** Quantitative pain analysis before and after animal-assisted activity, according to the use of analgesics

Variables	Moment	n	Mean	(SD)	Median	Minimum	Maximum	p value*
Pain	Before	17	5.6	(2.4)	5	2	10	0.004
	After	17	4.0	(3.2)	4	0	10	
Pain without analgesics	Before	9	4.7	(2.4)	4	2	8	0.030
	After	9	3.7	(2.6)	4	0	7	
Pain with analgesics	Before	8	6.6	(2.2)	7	4	10	0.041
	After	8	4.4	(3.8)	4.5	0	10	

\* Paired Student t test.

Hospitalization time had broadly varied: mean of  $3.3 \pm 4.6$  days, median of 1, varying from less than 24 hours to 16 days. With regard to outcome, there has been statistically significant difference between moments before and after AAA. Mean pain before intervention was  $5.6 \pm 2.4$  and after AAA it went to  $4 \pm 3.2$ , with 1.6 points decrease ( $p=0.004$ ). To assure such results, analysis was structured according to the use of analgesics and, again, there has been statistically significant decrease in pain levels after AAA (Table 4).

## DISCUSSION

There are evidences, in the studied population, that AAA was effective to decrease patients' self-referred pain, confirming literature data of studies carried out on the subject<sup>4,5,7</sup>. Without AAA children are subject to receive more painkillers, which may bring undesirable side-effects<sup>4</sup>.

Even not observing decreased pain sensation in some patients, it may be suggested that there is promotion of distraction, pleasure, leisure, welcome and tranquility<sup>4</sup>. Some studies have not shown significant pain sensation decrease, however they suggest that children with sound affective bonds had further decrease, suggesting that affection may be an important variable to be investigated and taken into consideration<sup>6</sup>, in addition to decreasing distress and improving cognitive, physical, social and emotional functions<sup>8</sup>.

It was observed that most AAA activities were "cuddling" and "chatting". Such result might be associated to metabolic effects of this type of interaction, since during contact with the animal, there are hormonal changes which may explain pain improvement, namely: endorphine production stimulation<sup>10</sup>, increased oxytocin, prolactin and dopamine after 5 to 24 minutes cuddling the animal<sup>11,12</sup>. In addition, increased oxytocin by means of AAI decreases the level of stress and anxiety, stimulating social interactions and intensifying human health<sup>13</sup>.

There may also be physiological factors improvement, such as decreased heart rate, blood pressure, body temperature, breathing level and pupil constriction, signaling relaxation<sup>10</sup>, indicators associated to decreased pain sensation. Similarly, studies suggest that AAI might lead to distraction/redirectioning of a problem, possible explanation for pain improvement.

The benefits of AAA for pain sensation observed in this study should be analyzed/evaluated under the perspective that the proposal is not to indicate the intervention as isolated option to manage pain, but rather as complementary therapy<sup>14</sup>.

## CONCLUSION

There has been significant pain sensation decrease after intervention with dogs, confirming some international studies on the subject, showing the importance of future studies in the area, which are still scarce in Brazil.

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