



LAUREA
UNIVERSITY OF APPLIED SCIENCES
Together we are stronger

Animal-Assisted Therapy on Children with Autism Spectrum Disorder

Méndez Moreno, Alba

2017 Laurea





LAUREA
UNIVERSITY OF APPLIED SCIENCES
Together we are stronger

Laurea University of Applied Sciences

Animal-Assisted Therapy on Children with Autism Spectrum Disorder

Alba Méndez Moreno
Degree Programme in Nursing
Bachelor's Thesis
March 2017

Table of Contents

1	Introduction.....	5
2	Autism Spectrum Disorder	5
3	Animal-Assisted Therapy	8
4	Animal-Assisted Therapy as an Intervention for Children with ASD.....	9
5	Purpose statement and research question	10
6	Methodology	10
6.1	Data search and inclusion criteria	10
6.2	Data appraisal.....	13
6.3	Data analysis	15
7	Systematic literature review findings.....	17
7.1	Implementations of AAT	18
7.1.1	Therapeutic riding.....	18
7.1.2	Dog-assisted play therapy	19
7.2	Outcomes of AAT	20
7.2.1	Improve in self-regulation	20
7.2.2	Improve in social skills	21
7.2.3	Improve in motor skills.....	21
7.2.4	Improve in executive skills	21
8	Discussion	21
8.1	Ethical considerations	24
8.2	Trustworthiness and limitations.....	25
8.3	Recommendations for further research.....	26
	References.....	27
	Figures	30
	Tables	31

1 Introduction

Even though the utilization of animals in therapeutic processes has existed all over history, the benefits of using animals in modern nursing were first described by Florence Nightingale. According to Matuszek (2010, 190), Nightingale wrote that “ *a small pet animal is often an excellent companion for the sick, for long chronic cases especially (...) A pet bird in a cage is sometimes the only pleasure of an invalid confined for years to the same room*”. Later on, during the World Wars and due to the unavailability of antibiotics, nurses used dogs to lick soldiers’ wounds - as, back then, it was believed that this would prevent infection.

Autism-spectrum disorder (ASD) is a lifelong condition for which there is not an available cure or pharmacological treatment. Animal-assisted therapy (AAT) has been proved to be a beneficial complementary, non-pharmacological therapeutic methods in some other client groups such as elderly with dementia (Buettner, Fitzimmons & Barba 2011) and children suffering from ADHD (Schuck et al. 2016). The chronic, non-curable nature of ASD together with the constantly growing number of children being diagnosed with this disorder creates a need for new therapies aimed to autistic children’s rehabilitation and profile children with ASD as a potential group that could benefit from AAT. In this thesis, a literature review has been conducted in order to gather evidence-based knowledge on this topic.

In 2013, Marguerite O’Haire published a literature review on animal-assisted interventions for autism spectrum disorder. In her review, O’Haire presented a preliminary view of animal-assisted intervention (AAI) as potentially beneficial for ASD in many of the areas of development. O’Haire recommended further and more rigorous research on the topic, as the consistency of the evidence found and the study design of the articles used for review was poor. This thesis will focus on animal-assisted therapy, which is a type of AAI. Almost five years after the publication of O’Haire’s review, it is possible that more recent empiric studies on AAT have been published.

2 Autism Spectrum Disorder

The term “autism” was coined in 1912 by Eugene Beuler, who then associated autism with childhood schizophrenia (Holaday 2012). Later on, in the 1950s, it was believed that autism was a result of poor parenting and lack of love and attention from the mother to the child (Kanner 1949, 416-426). This theory was discarded long ago, but the concrete cause of the disorder remains unknown.

The term “Autism Spectrum Disorder” describes a wide range of common neurodevelopmental disorders characterized by abnormalities in three core areas of the child’s development:

impairment in reciprocal social interactions, deficits in verbal and non-verbal communication and repetitive, stereotyped behaviours (Merrick & Zachor 2014, 9). These three kinds of behavioural symptoms disturbing social and occupational functioning, known as the “impairment triad”, constitute the current clinical criteria for the diagnosis of autism spectrum disorder (Cashin et al. 2013). It is estimated that autism spectrum disorder has an incidence of about 1% of children worldwide (WHO 2016), being up to five times more common in males than in female individuals (Christensen et al. 2014).

Autism spectrum disorder manifests itself before the age of 3. Nevertheless, the symptoms and features characteristic of ASD can usually be appreciated at the age of may appear already during infancy (Huttunen 2015). ASD is a lifelong condition which cannot be cured and, even though some secondary associated symptoms - such as sleep disorders and restlessness - can be treated pharmacologically, management of ASD focuses on rehabilitation through therapies, functional guidance and different pedagogic methods. Although autism spectrum disorder is known to be of biological origin, the concrete cause for the disorder has not been found yet. (Vanhala 2016).

Autism spectrum disorder is composed by several disorders very different to each other: Childhood autism, childhood disintegrative disorder, Rett’s disorder, and Asperger’s disorder and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) (Vanhala, 2016). For this reason, the symptoms are different for each child. These symptoms can, however, be classified into three main groups: behavioural, communicative, and social symptoms. (Jolly 2015). Lack of interest and/or withdrawal from social contact and social situations, delays in the speech and repetitive behaviours are amongst the most common symptoms (Huttunen, 2015), which are shown in figure 1:

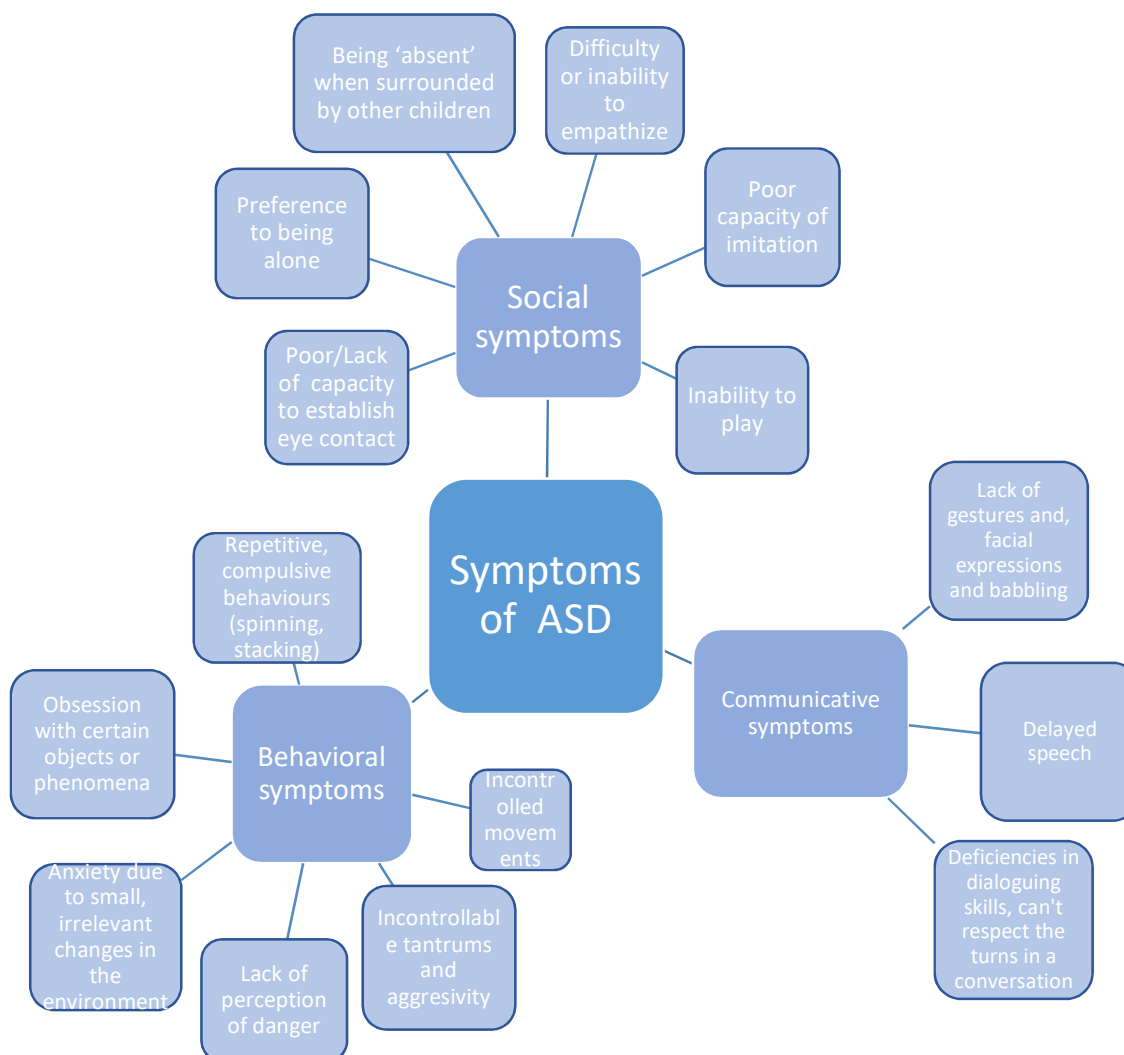


Fig. 1: Most common symptoms of ASD. Source: Vanhala (2014)

The functional and intellectual capacity of the children diagnosed with ASD varies broadly. While there are children with Asperger's syndrome who have an intellectual capacity that is clearly above the average, many children with Rett's syndrome have a profound mental handicap. Nevertheless, the limits between the different specific forms of autism spectrum disorders are rather blurry. For this reason, the next edition of the code for International Classification for Diseases (ICD) edited by the World Health Organization will no longer differentiate between subtypes of autism spectrum disorders - which means that, in the future, the diagnose will be simply ASD. (WHO 2017)

3 Animal-Assisted Therapy

Animal-assisted therapy (Also called animal-facilitated therapy) is the integration of goal-directed interactions based in the human-animal bond (Chandler 2011, 5) by a health care or social services professional with specific competence in animal-assisted therapy. The human-animal bond is a theory defined by the American Veterinary Medical Association (AVMA) as “ *the mutually, beneficial and dynamic relationship between people and other animals that is influenced by behaviors that are essential to the health and well-being of both. This includes, but is not limited to, emotional, psychological, and physical interactions of people, other animals, and the environment*”.

In animal-assisted therapy (AAT), the therapist uses his or her expertise to set goals and design “tailor-made” adapted to the client’s conditions and functional capacity. This is the main difference between AAT and animal visitation or animal assisted therapy - as these last two ones are of a casual, leisure-like nature. (Chandler 2011, 5). It must also be mentioned that a therapy animal and a service animal aren’t the same: service animals are trained to assist their owners in what they can’t do themselves due to a disability, independently on whether they also have a therapeutic goal or not. Service animals usually have a special permission to accompany their owners to places where animals are, otherwise, not permitted.

Different animals are used in animal-assisted therapy. The kind of animal the therapy will be implemented with depends of the clients’ functional capacity, goals and preferences. The most popular animals for AAT are dogs due the long list of advantages they represent. Dogs usually love contact with people, establish eye contact easily, and are very expressive in their emotions - which makes them a good animal therapy for clients with difficulties to socialize and empathize. In addition, dogs are usually very intelligent, which makes it possible to train them to obey a wide range of commands and perform tricks.

Cats are also a good alternative in case the client or his/her family doesn’t prefer not to be in contact with dogs. A great advantage that cats offer is that they can be kept in the lap and be cuddled to develop nurturing - even if they cannot be trained to do as many skills as a dog. For this reason, cats are a good option to people with reduced mobility. Horses may be therapy animals, too; and they easily awake the curiosity of many clients, as they are not the kind of animals that they usually have at home. In addition, riding a horse may help the client develop their motor skills. Other animals that have been used in AAT are rabbits, llamas, guinea pigs, hamsters and even camels. Reptiles are not recommended for AAT, as they are more prone to transmitting diseases and react dangerously (Chandler 2011, 61-72).

4 Animal-Assisted Therapy as an Intervention for Children with ASD

Animal-assisted therapy is not an independent profession but a practice discipline integrated within the therapist's social or healthcare-related professional scope of practice (Matuszek 2010). This is applicable to nursing, too, meaning that AAT can be part of nursing care as a nursing intervention.

As already mentioned, the AAT process consists of assessment, setting of goals and planning, implementation and evaluation. This four-step process matches almost perfectly with Ida Jean Orlando's theory of nursing process, which consists of five phases - Assessment, nursing diagnosis, planning, implementation and evaluation (Alligood 2013, 55). Hence, we can say that AAT is applicable to nursing from the theoretical point of view.

Virginia Henderson included "interacting with others to express oneself" as one of the premises for her nursing theory, the theory of needs. This is another point of union between nursing, ASD and AAT. Autism-spectrum disorder impairs mainly the child's capacity of normal social interaction - which is, according to Henderson's theory, one of the main needs of human beings. Animal-assisted therapy is based in the interaction between a human and an animal with therapeutical purposes, so by providing AAT to a child with ASD we are implementing a nursing intervention aimed to satisfy the child's need for social interaction - a need which is impaired.

Nurses are present in all of the health services used by children with ASD and their families. Nevertheless, nurses usually play their most crucial role in the care of ASD through guidance and rehabilitation of the children (which is the case of, for example, care homes for autistic children or children's psychiatric wards). In this kind of units, nurses do not only implement the rehabilitative actions negotiated by the multiprofessional care team: they are also the ones responsible for the coordination of the child's overall care.

Also and in addition, nursing is no longer limited to the clinical field, to bedside care and to delegated medical interventions. Nursing has evolved to the point of aiming to caring for the client integrally and as a whole entity (holistic nursing care). Consequently, nurses have gained competence and independence to achieve this aim. In many countries, nurses are nowadays eligible for psychotherapy, family therapy and play therapy education. A nurse can, hence, be also an independent certified psychotherapist, play therapist or family therapist who integrates AAT in their professional practice. As a result, it can be stated that AAT is a nursing intervention oriented towards holistic client care.

5 Purpose statement and research question

The purpose of this thesis is to describe what kinds of animal-assisted therapy have been implemented on children with autism spectrum disorder as well as describing the outcomes of animal-assisted therapy on children with ASD.

Two research questions will be formulated: “*What kinds of animal-assisted therapy have been implemented on children with autism spectrum disorder?*” and “*what have been the outcomes of animal-assisted therapy in children with autism spectrum disorder?*”

6 Methodology

The research method chosen for this thesis was systematic literature review. A systematic literature review answers the research question by making a synthesis of the research-based evidence available on the topic in which the research is focused. (Bettany-Salitkov 2012, 5).

The first step for a systematic literature review is formulating a research question that sets the focus for the research. Based on that question relevant, high-quality research evidence are identified, appraised, summarized and represented systematically. The methodology employed must be shown with detail and unambiguously, in such a way that it could be replicated. (Bettany-Salitkov 2012, 5-6).

This research method suits the aim of this thesis as it allows to create a paper from which nurses caring for children with a diagnosis of ASD can find evidence-based information that is relevant to their work.

6.1 Data search and inclusion criteria

The keywords identified for this research were *animal-assisted therapy*, *child* and *autism spectrum disorder*. The word “child” was marked with an asterisk (*) so that other possible inflections of the word could be included into the search. “Animal-facilitated therapy” and “pet therapy” were be accepted as a synonym for “animal-assisted therapy”. In the same way, the initials “ASD” were used as a substitute keyword to “Autism Spectrum Disorder” When conducting the search, the keywords were connected through the Boolean operator AND.

The search process was conducted between the 23rd and the 27th January, 2017. The search engines used were Laurea Finna and Helka. Laurea Finna is Laurea University of Applied Sciences’ own search engine, which shows articles from all the journals the UAS is subscribed to

- with the exception of EBSCOHost (Laurea Finna ND). Helka is the search engine of the University of Helsinki, which works in a similar way with Laurea Finna - but is subscribed to more journals and, in addition, does show results from EBSCOHost. By using two search engines that complement each other, more search results are aimed.

The preliminary criteria for the article search were full text, peer reviewed and published on 2007 or later. By doing this, the search showed articles that are up-to-date, reliable and accessible for thorough analysis.

Next, the most relevant articles were selected. In the first selection phase, the titles and abstracts of the papers were reviewed in search for articles that could answer the research question. In order to facilitate a clearer analysis of the research evidence collected, only primary sources were used. When selecting the articles, it was noticed that the authors of several articles used the word "autism" and "autistic" as a synonym for "autism-spectrum disorder". For this reason and, even though those three terms are not perfect synonyms, results of articles including such terms were also accepted into the selection of articles. Based on the abstract and theoretical background it was also noticed that some authors used the term " (animal-assisted) intervention" as a synonym to animal-assisted therapy, which justifies the inclusion of such articles into the list of articles for further review.

The following table (Table 1) shows the amount of articles retrieved from the search and classifies the results based on the key words employed:

Keywords	Database: Laurea Finna	Database: Helka	Total of arti- cles shown	Total of articles discarded	Articles for more ex- tensive review
Animal- assisted ther- apy AND au- tism spectrum disorder AND child*	Number of hits: 154 Articles for review: 16	Number of hits: 89 Articles for review: 10	243	178	26
Animal- facilitated therapy AND autism spec- trum disorder AND child*	Number of hits: 11 Articles for review: 0	Number of hits: 7 Articles for review: 1	18	17	1
Animal- assisted ther- apy AND au- tism AND child*	Number of hits: 70 Articles for review: 11	Number of hits: 62 Articles for review: 7	132	114	18
TOTAL OF ARTICLES FOR MORE EXTENSIVE REVIEW					45

Table 1: Results of the article search

In total, 393 articles from both databases fulfilled the preliminary criteria. After reading the title and abstract of the articles, the papers not directly related to the search keywords or to the research question were excluded. After doing this, 45 articles were left. From those 45 articles, it was noticed that many of the papers were repeated and, consequently, duplications were filtered out - leaving a total of 15 articles. However, it was noticed that not all of those 15 publications were scientific, evidence-based articles: some were informative brochures, editorials or anecdotal reports. Once those publications were excluded the final number of articles to be used for the review was nine. Figure 2 illustrates this process:

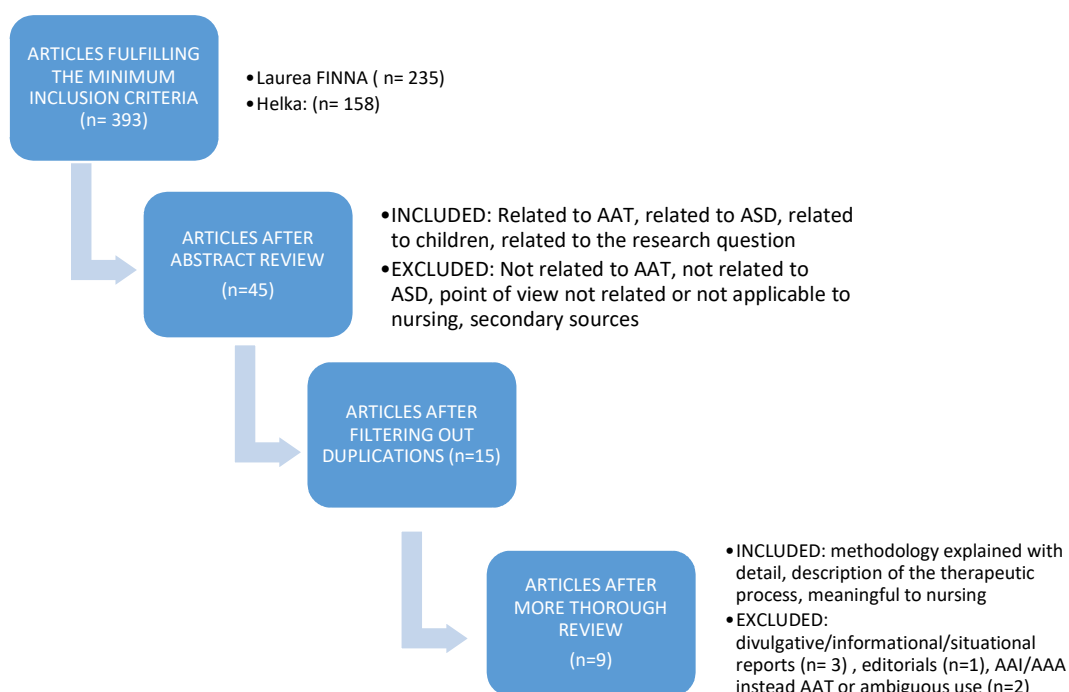


Figure 2: The data appraisal process

6.2 Data appraisal

The Equator Wizard (ND) was consulted in order to find recommendations on suitable evaluation guidelines for each article. Using the recommended guidelines as a checklist, all the articles were appraised in order to determine the quality, strengths and weaknesses of each paper. The search engine suggested three kind of guidelines were used: the SRQR statement for the qualitative articles (O'Brien et al. 2014), the CARE statement for case reports (Riley et al. 2013), and the CONSORT appraisal tool for trials. Each of these checklists contains a different amount of sections and thus it is very difficult to grade the quality of the articles in terms of a unified grading system. To solve this issue, the "grade" of each article will be shown as a fraction with the format $\frac{a}{b}$, in which a represents the number of sections fulfilled by the article and b is the total number of sections in the checklist. Based on this, then percentage of requirements fulfilled will be calculated by multiplying the fraction by 100 ($\% = \frac{a \cdot 100}{b}$). The categories of evidence will be assigned according to the percentage of requirements met: category A (100-80%) for excellent evidence, category B (60-79%) for high evidence, category C (40-59%) for weak evidence and category D (under 40%) for poor evidence. To ensure the

quality of evidence in this thesis, only articles in categories A and B will be included. The results are displayed in the following table (table 2):

ARTICLE	TYPE OF ARTICLE AND GUIDELINES EMPLOYED	GRADE AND CATEGORY
Borgi, M. Et al., 2015. Effectiveness of a Standardized Equine-Assisted Therapy Program for Children with Autism Spectrum Disorder. <i>Journal of Autism and Developmental Disorders</i> . 46(1). 1-9	Qualitative, SRQR	16/21 (76%), Cat. B
Fung, C.S., 2015. Increasing the Social Communication of a Boy With Autism Using Animal-assisted Play Therapy: A Case Report. <i>Advances in mind-body medicine</i> . 29(3).27-31	Case report, CARE	10/14 (71%), Cat. B
Fung, S. & Leung, A.S., 2014. Pilot study investigating the role of therapy dogs in facilitating social interaction among children with Autism. <i>Journal of Contemporary Psychotherapy</i> . 44(4), 253-262	Qualitative, SRQR	17/21 (80%), Cat. A
Gabriels, L.R. et al., 2011. Pilot study measuring the effects of therapeutic horseback riding on school-age children and adolescents with autism spectrum disorders. <i>Research in Autism Spectrum Disorders</i> . 6(2). 578-588	Qualitative, SRQR	18/21
Kern, J. et al., 2011. Prospective Trial of Equine-assisted Activities in Autism Spectrum Disorder. <i>Alternative Therapies in Health and Medicine</i> . 17(3). 14-20	Trial, CONSORT	22/25 (88%), Cat. A
Gabriels, R. et al., 2015. Randomized Controlled Trial of Therapeutic Horseback Riding in Children and Adolescents With Autism Spectrum Disorder. <i>Journal of the American Academy of Child and Adolescent Psychiatry</i> . 54(7), 541-9	Trial, CONSORT	20/25 (80%), Cat. A
Ward, S. et al., 2013. The Association Between Therapeutic Horseback Riding and the Social Communication and Sensory Reactions of Children with Autism. <i>Journal of Autism and Developmental Disorders</i> . 43(9). 2190-2198.	Qualitative, SRQR	15/21 (71%). Cat. B
Bass, M. et al., 2009. The Effect of Therapeutic Horseback Riding on Social Functioning in Children with Autism. <i>Journal of Autism and Developmental Disorders</i> . 39(9),1261-2167	Qualitative, SRQR	17/21 (80%), Cat. A
Memishevikj, M. & Hodzhikj, S., 2010. The effects of equine-assisted therapy in improving the psychosocial functioning of children with autism. <i>The Journal of Special Education and Rehabilitation</i> 2010, Vol.11(3/4), 57-67	Qualitative, SRQR	16/21 (60%), Cat. B

Table 2: Evaluation of the quality of the articles

6.3 Data analysis

The research method chosen was qualitative content analysis. This method consists of examining all the articles, get acquainted with the contents and highlighting the recurrent concepts and topics under which the data could be categorized. The approach used was inductive, which aims to classifying the specific data into more abstract categories, and then grouping up these categories into more general, abstract propositions (Kyngäs & Elo 2008).

In order to achieve this, first the articles were thoroughly read. After that, the specific data was extracted and listed. With the help of that list, recurring topics were identified. Based on these recurring topics, the data was next classified into sub-headings. Finally, similar sub-headings were grouped into main themes. This process was done with each of the two research questions separately. Figures 3 and 4 show this process in a schematized way:

RESEARCH QUESTION 1: ‘‘WHAT KINDS OF ANIMAL-ASSISTED THERAPY HAVE BEEN IMPLEMENTED ON CHILDREN WITH AUTISTIC SPECTRUM DISORDER?’’



Figure 3: Kinds of AAT

RESEARCH QUESTION 2: “WHAT HAVE BEEN THE OUTCOMES OF ANIMAL-ASSISTED THERAPY ON CHILDREN WITH ASD?”

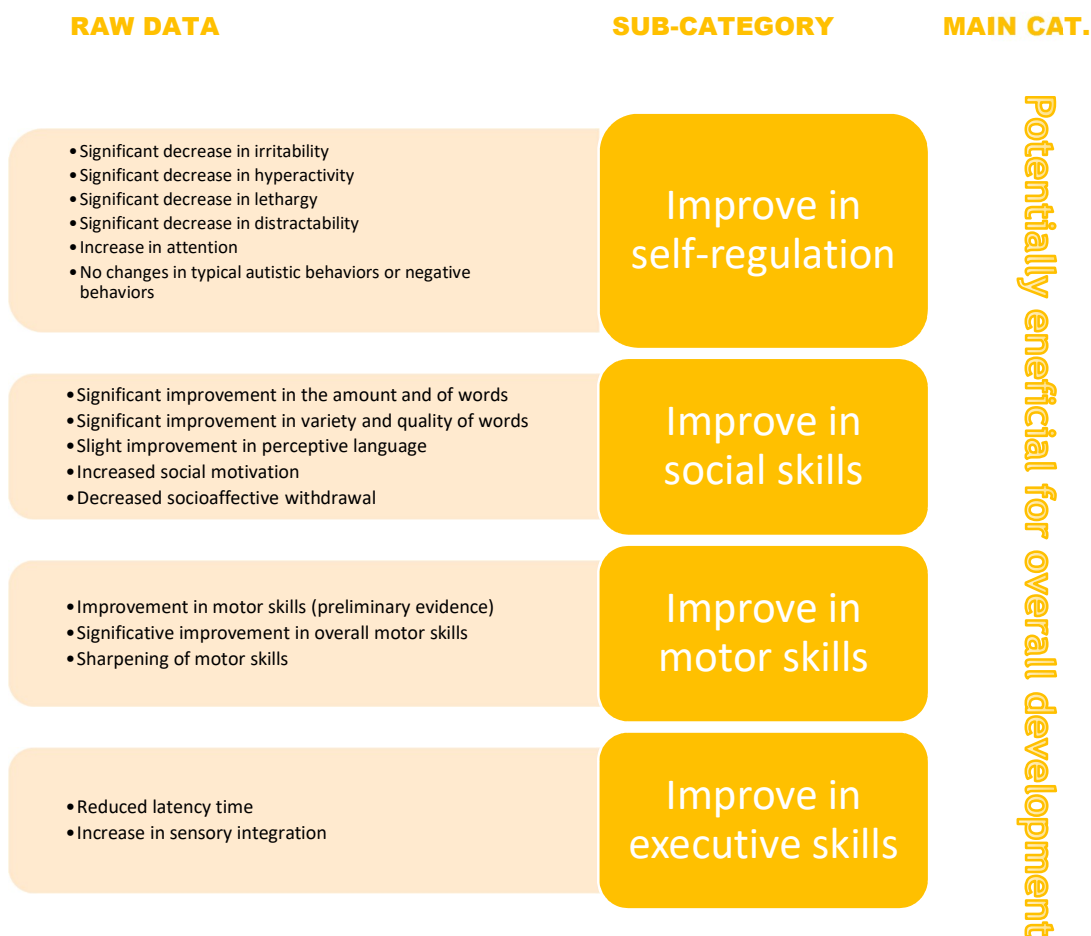


Figure 4: Outcomes of AAT

7 Systematic literature review findings

In order to answer the research questions, nine articles were systematically reviewed. After this, the data extracted from the articles was displayed in the findings section.

The answers to the first question, “How has animal-assisted therapy been implemented on children with autism spectrum disorder?”, were organized into two main categories (Therapeutic riding and animal-assisted play therapy) divided into ten sub-headings. The second question, “What were the outcomes of AAT?” was answered by data grouped into four sub-headings that led to a single category: Potentially beneficial for overall development.

7.1 Implementations of AAT

The answers to the research question ‘‘How has AAT been implemented?’’ were classified by identifying the different kinds of AAT found through literature research. Two sub-types of AAT were identified: Dog-assisted play therapy and therapeutic riding.

7.1.1 Therapeutic riding.

A vast majority (77,7%) of the articles answering to the first research question were related to therapeutic riding (TR). For this type of AAT, six types of interventions were identified. These types of interventions were used as sub-headings: elaboration of a therapy plan, routines and repetition as a therapeutic tool, use of communicative materials and devices, training of motor and skills through horseback riding, horsemanship skills as a tool for child-horse bonding and practicing the giving of feedback.

The use of routines and repetition as a therapeutic tool was found to be recurrent through the therapeutic horseback riding sessions described by the articles. Kern et al. (2011) highlight the importance of assigning the same horse to the child in order to facilitate the bonding process. In addition to this, in the TR sessions described by Gabriels et al. (2011) (2015) and Ward et al. (2013), the same volunteer side-walkers were assigned to the children for every session when possible. All the equine-assisted therapy programmes described in the articles used for this review had an own, consistent routine - which means that the activities in each therapy session always happened in the same order. In the therapy programme described by Gabriels et al. (2011) (2015), a review and repetition pattern applied in order to keep the children oriented in time. The schedule and objectives of the day would be introduced to the children with a picture schedule before starting the riding session. The events occurred and the new skills learnt on the previous session were reviewed before starting the horseback riding and, in a similar way, in the end of the lessons the group would make a summary of the activities of the day.

As ASD is a disorder affecting mainly to the child’s capacity to communicate, the pedagogic techniques employed were adapted to children with disabilities in speech or understanding. For a better understanding, specific and simple commands were given to the children and to the horse (Ward et al. 2013). In case of the child not being able to understand or pay attention, visual aids - such as flashcards and diagrams - were available in many of the therapy centres (Borgi et al. 2015) (Gabriels et al. 2015) (ward et al. 2013). In the studies where also non-verbal children participated, the problem of the child not being able to give spoken orders to the horse was solved by using basic sign language (Bass et al. 2009) or by employing horses trained to obey to assisted language devices attached to the saddle (Kern et al., 2011).

In order to keep the children motivated, in one of the programmes children received positive feedback and reinforcement such as high-fives and hugs after completing an exercise (Bass et al. 2009)

Horseback riding was used in all of the therapy programmes described in order to train the children's motor and coordinative skills. Practising mounting and dismounting as well as walk and trot (with their corresponding commands) was included in all of the therapy programmes. Other skills learnt were steering, turning, and directing the horse through obstacles. Most of the therapy programmes blended the learning of those skills targeted to motor abilities and coordination into games (Borgi et al. 2015) (Gabriels et al. 2011) (Gabriels et al. 2015) (Ward et al. 2013) (Bass et al. 2009). In addition, also group socialization games to be played sitting on the horse were arranged. (Borgi et al. 2015) (Gabriels et al. 2011) (Gabriels et al. 2015) (Ward et al. 2013) (Bass et al. 2009). In addition, in the sessions of the riding programme described by Ward et al. (2013), a "quiet riding" phase would open the session. This means that the children were put to sit on the horse and were taken to peacefully stroll over the property, so that they could relax and focus on feeling the horse.

Also horsemanship and horse ownership activities were included in all the therapeutic riding programmes in order to train memory, facilitate the bonding process. Tacking, untacking, brushing and grooming were present in all the therapy programmes described. In the programmes reported by Gabriels (2011) (2015), basic information about horses and about equine behaviour was given to the children. In addition, in the programme described by Bass (2009), a comparative anatomy approach was used in order to explain the children how the body of a horse works. In the therapy programmes in Borgi et al. (2015) and Bass (2009), the children were asked to identify and memorise the tools needed for grooming and bathing.

For ASD children, understanding human conventions - such as courtesy - is a major challenge. In all of the programmes described the children were encouraged to always verbally and physically thank the horse after the sessions, as well as saying goodbye. The same way, praising the horse after a correctly executed action was encouraged.

7.1.2 Dog-assisted play therapy

Two of the articles reviewed were related to dog-assisted play therapy. Both of the articles are written by the same author and describe identical processes. From the point of view of the implementation of the therapy, the only difference between both papers was the number of participants. It was induced that the interventions implemented in the two programmes reported by Fung (2014) (2015) could be classified into four types: Build-up of the child-dog

relationship, introduction of another person as part of play, diminishing the role of the dog in play and play with another person without presence of the dog.

During the build-up of the dog-child relationship, the therapist would encourage the child to be in as much contact as possible with the dog (touch, eye contact and verbal interaction). Fung (2015) describes helping the children identify the dog's body parts and encouraging the children to feed and clean the animal in order to help the child focus solely in the animal.

For the next kind of interventions, Fung (2014) (2015) explains how the therapist introduces herself as part of the interaction between the child and the dog. In her paper written in 2015, Fung explains how the therapist used a ball game in order to introduce a 3-participant intervention (child, dog and therapist).

Fung had as an objective to progressively reduce the role of the dog in the child-therapist relationship in order for the child to be able to re-direct his attention to a human subject. In order to achieve this, the therapist introduced a basketball-like game in which the dog was present, but did not actively participate in the game.

The fourth kind of interventions reported by Fung (2014)(2015) are interventions centered in the interaction between the child and the therapist, with diminished presence of the dog. For this, Fung (2015) describes how a balloon game was used by the therapist to engage the child into play without the presence of the dog.

7.2 Outcomes of AAT

The reported outcomes of AAT were very different in almost every article. The outcomes were classified into wider sub-categories depending on the area of development they affect to: improvements in self-regulation, improvements in social skills, improvements in motor skills and improvements in executive skills. Due to all of these outcomes being positive, it was induced that animal-assisted therapy is potentially beneficial for the child's overall development.

7.2.1 Improvement in self-regulation

The outcomes that were reported most often were the ones affecting self-regulation. A significant decrease in irritability and hyperactivity was reported in both papers by Gabriels et al. (2011)(2015). Gabriels et al. (105) also reported a significant decrease in lethargy. A decrease in the child's distractibility and increase in attention has been described by Bass et al.

(2009) and Gabriels et al. (2012) (2015). Fung (2014) reported that no changes were appreciated in the child's possible autistic features and negative behavior, but highlights that the child in question did anyway hardly ever show such behaviours at baseline.

7.2.2 Improvement in social skills

Significant improvements on social skills were detected in different studies. Gabriels et al. (2011) report a significant improvement in the use of communicative language (with an increase on the amount and quality of words spoken), but only a slight tendency to improve was detected on perceptive language. A significant increase on social motivation was highlighted by Bass et al. (2009) and Gabriels et al. (2011), which is coherent with the findings by Borgi et al. (2015) of the reduction of the children's social withdrawal.

7.2.3 Improvement in motor skills

The outcomes on motor skills found were consistent. While Borgi et al. (2015) show preliminary evidence on the improvement of the children's motor skills and a later study by Gabriels et al. (2011) found significant improvement on the motor area. Also, Bass et al. (2009) made findings related to the sharpening of the motor skills and linked it to a possible stimulation of the cerebellum while riding.

7.2.4 Improvement in executive skills

Significant improvements on the child's executive skills were also reported by Borgi et al (2015) by showing a decrease on the latency (i.e. the time passed between the presentation of a problem and the start of the action taken by the child to solve it)

8 Discussion

All the articles retrieved from Laurea Finna and Helka were reports of different animal-assisted therapy implementations measuring the effects of the therapy in the child's functional and psychosocial development. In addition, all nine articles had a very similar structure, describing both the therapeutic interventions implemented and the impact of the therapy on the child's psychosocial and functional development. The totality of the articles concerned either therapeutic riding or to animal-assisted play therapy.

The therapeutic riding sessions were mainly composed by two parts: horsemanship skills and horseback riding. While the horsemanship-centered activities clearly aimed to promoting the bond between the child and the horse, the horseback riding-related activities were more centered on the training of the child's motor and executive skills. This aim is congruent with the evidence found: the children participating in therapeutic riding programmes experienced improvements in their social skills, language skills, motor skills, self-regulatory skills and adaptive/executive skills. The possibility of training so many different areas of development might be one of the reasons why the vast majority of the papers discussed therapeutic riding.

According to the results, therapeutic riding seems to be especially beneficial for the promotion of the child's self-regulation - which is an area on which play therapy did not produce significant improvements. The papers reviewed reported improvements in autistic children's mood, tone and attention as well as significant decreases in irritability, lethargy, stereotypic behaviour, distractibility and attention. The authors of the papers do not seem to have a clear answer to why this is the area of psychosocial development with most positive outcomes. A possible reason for this is that all of these areas of self-regulation are tightly linked to the child's capacity to willingly direct their attention towards a specific element (the animal), as well as engaging in cooperative interaction with the horse - as pointed out by Bass et al. (2009) . A horse or a pony is more likely to attract the child's attention and fascination because they are something more extraordinary and uncommon than a human person. Poor voluntary display of attention is, as it has been commented previously, a very typical symptom of ASD. If a child with ASD has the opportunity to be regularly in contact with something they can focus on, the autistic child's overall capacity of attention might improve. Another possible factor that might have had a positive effect on autistic children's self-regulation is the fact of riding sessions having always the same structure. Due to autistic children's diminished capacity to adapt to changes and new situations, routine-based based learning is generally the most suitable approach for functional rehabilitation of children with ASD (The Australian Autism Alliance ND)

The positive outcomes of riding therapy on autistic children's social skills and speech is also significant. This fact was widely hypothesized by the writers of the papers retrieved for review. While some attributed the improvement of social behaviours to animals' inherent ability to engage in positive social engagement (Borgi et al. 2015), others believed that the softening of social and emotional withdrawal experienced by the children comes from the multi-sensorial nature of the stimulation received by the child while riding and interacting with the horse (Bass et al. 2009). As a poor ability to process and produce verbal communication is one of the main features of ASD, the constant use of very simple and concrete commands during the therapeutic intervention - which is much encouraged when interacting with a children with ASD (The National Autistic Society 2011, 3) - possibly helped the children to practice

verbal communication. In addition, the use of communicative assisting devices and material (such as diagrams, flashcards and verbal communication devices attached to the horse) may have helped in a similar manner. The author of this thesis hypothesized that the improvement on verbal skills doesn't have a single cause, and the use of special communicative aids and communicative pedagogical methods might have played as much of an important role as the presence of the animal did.

Evidence on the development of the children's' motor skills was detected. Horseback riding is a physically demanding activity in which areas like coordination and balance are crucial. This is consistent with the findings on improved motor planning and, sensorial integration and sensorial sensitivity. It has been proved that motor and cognitive development are tightly related to each other, and that motor stimulation is a booster for the child's cognitive development (Piek et al. 2008). Hence, the author of this Bachelor's thesis suggests that the motor development occurred during the therapeutic interventions might have contributed to the improvements in the other areas of outcome. However, deficiencies in motor development are not per se a characteristic symptom of ASD and, consequently, the enhancement of motor areas should be considered as a collateral benefit.

In the case of animal-assisted play therapy, the outcomes are more unclear. The therapeutic interventions in both papers were designed and implemented by the same therapists. The intervention itself was also identical, differing only in the number of children the therapy was applied on. First, the therapy would help the child focus on and bond with the dog, Then, the therapist would include herself in the play between the child and the dog. The presence of the dog would be progressively diminished through the therapeutic process to the point that, in the end, only the child and the therapist would engage in play.

The first animal-assisted play therapeutic intervention - with only one child participating - reported improvements in social and non-social behaviour of the child in presence of the dog, but these improvements weren't preserved once the dog was put apart. The outcomes of the animal-assisted play therapeutic intervention with more participants are rather unclear: significant improvements are related in the children's overall social behaviour score and overall verbal social behaviour score as well as decreases in overall non-social behaviour cores, but the report does not give any details on how this happened or on what kind of concrete skills and abilities was an increase. The common point for the outcomes of both interventions is the role of the dog as a social facilitator or "ice breaker", but otherwise there is not a significant consistency between both studies.

8.1 Ethical considerations

Core ethical science principles such as honesty, objectivity, integrity, carefulness and openness (Resnik 2015) guided the entire writing process of this thesis. Also, academic malpractices such as collusion, fabrication, falsification and plagiarism (ICA 2013) were avoided at all costs.

During the writing process of this Bachelor's thesis, every effort was made to avoid plagiarism. Laurea University of Applied Sciences' guides for referencing (King 2013) were followed in order to ensure that the authors of the sources employed have been given full credit for their work. In addition, referencing adequately ensures clarity on the origin and trustworthiness of the information used in the writing process of this thesis.

Literature review, the thesis method through which this Bachelor's thesis was conducted, does not involve experimenting on - or extracting data directly from - human beings. Hence, no ethical issues related to obtaining research permissions, participant anonymity or confidentiality of the data collected were encountered. However, this does not mean that literature review is, as a method, exempted of potential ethical issues.

All of the articles used for this literature review reported to have both written consent from the parents of the children and the approval of an ethical committee. Also, all of the articles reported that the welfare of the therapy animals was ensured through constant screening. Nevertheless, none of the articles give details on how the potential risks and benefits of the therapeutic intervention were explained to the parents of the children so that they could make an informed decision of consent. In addition to this, only three of the articles had a clear description of their source of funding - as well as the possible conflicts of interest that the source of funding could cause.

Finland's Government Decree on Universities of Applied Sciences (2014) requires every student to elaborate a Bachelor's thesis as part of the legal requirements to obtain a Bachelor's degree granted by a University of Applied Sciences. This way, this thesis is a compulsory part of the author's Nursing degree aimed to prove the scientific competence acquired during the studies. There were not any third parties (such as companies or organisations) involved in any stage of the research process, and no funding was obtained for it. Hence, it can be stated that there were no conflicts of interest related to the findings and publication of this thesis.

8.2 Trustworthiness and limitations

The factors determining the trustworthiness of a research encompasses the study's credibility, dependability, transferability and confirmability (Gunawan 2015). This means that the study must be applicable to other contexts, reproducible, truthful and impartial.

In order to achieve a high level of reproducibility, the methodology through which data was collected, appraised and analysed was described with as much detail as possible. Validity was ensured by only including articles published after 2007. In addition, reliability was aimed to by including only articles that, after several selection phases and evaluation with an adequate guideline, were identified as of good quality.

Regardless of the author's efforts to ensure the trustworthiness of this Bachelor's thesis, several limitations were identified. It was noticed that, in many of the articles reviewed, part or even the totality of the data was collected by regularly asking the parents or school teachers about the behaviour of the children. This means that part of the data about the behaviour of the children is based on subjective opinions and valuations done by members of the children's' support network, and hence, there is a significant threat of that data being biased. This could have been avoided by having trained professionals assess the evolution of the children's' behaviours.

The absolute lack of quantitative data limits the transferability of the results to other fields. All of the articles reviewed for this thesis had a very small number of participants, and hence only qualitative data was obtained. Also, the evidence on Animal-assisted Play Therapy is limited to only two studies -one of which has only one child as a participant - conducted by the same therapist, with an identical intervention, with the same parameters.

In addition, only papers discussing two kinds of AAT - riding therapy and animal-assisted therapy -were found. There is not any available research-based evidence on the implementation and outcomes of other kinds of animal-assisted therapy and. Hence, it can be stated that AAT still lacks supporting evidence as a wider concept.

Only articles written in English were included in this review. On the one hand, this improves the reproducibility of this Bachelor's thesis from the point of view of its potential reviewers. Nevertheless, by limiting the article search results to only papers in English, possible scientific evidence on AAT available in other languages is left out from the review.

Lastly, only the search engines of two universities were used. This means that more evidence on AAT might possibly be available in other journals to which neither of both universities are subscribed to.

8.3 Recommendations for further research.

The main limitation for all the articles reviewed was a very small number of participants - which, as a consequence, did not allow to produce quantitative data that could complement the existing qualitative data. The author of this thesis considers that it would be very recommendable to make studies about AAT on a wider scale and on bigger samples of population, in order to systematize the results.

Only two kinds of AAT were documented through the scientific literature consulted. As a consequence, the totality of AAT as a bigger concept still lacks supporting scientific evidence. Studies on other kinds of AAT would be needed. From the point of view of nursing, studies on animal-assisted psychotherapy would be especially interesting, as registered nurses can become psychotherapists in many countries. It would also be of great interest for nursing science to get more consistent evidence on animal-assisted play therapy, because play itself is a nursing intervention recognized in most of the nursing intervention classifications.

Last but not least, there is a need to research AAT from the point of view of nursing and nursing science. There were not any primary sources on animal-assisted therapy from a nursing perspective and/or implemented by nurses. Lastly -and because still nowadays the majority of nursing professionals work in clinical environments- the applicability of animal-assisted therapy within a clinical (or even acute) setting would be of major relevance for the nursing community.

References

- Printed materials:

Alligood, M.R., 2013. Nursing Theorists and their Work. 8th edition. Mosby.

Chandler, C.K. 2011. Animal-Assisted Therapy in Counseling. New York: Routledge Taylor & Francis Group

Giarelli, E., Gardner, M. 2012. Nursing of Autism Spectrum Disorder: Evidence-based Integrated Care across the Lifespan. New York: Springer publishing company.

Merrick, J. and Zachor, D.A. 2013. Understanding Autism Spectrum Disorder: Current Research Aspects (Pediatrics, child and adolescent health). New York: Nova Biomedical.

O'Brien, B.C., Harris, I.B., Beckman, T.J., Reed, D.A., Cook, D.A. 2014. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 89 (9), 1245-51.

- Electronic sources.

Bass, M., Duchowny, C.A. & Llabre, M.M., 2009. The Effect of Therapeutic Horseback Riding on Social Functioning in Children with Autism. Journal of Autism and Developmental Disorders. 39(9),1261-2167. Article from PubMed. Accessed on 15.5.2017.

Bettany-Salitkov, J. 2012. How to do a systematic literature review in Nursing: A step-by-step guide. McGraw-Hill Open University Press. New York 2012 (eBook). Accessed 20.01.2017.
<http://web.b.ebscohost.com/ehost/ebookviewer/ebook/bmxlYmtfXzQ2MDY0Nl9fQU41?sid=422c291a-ff3b-4643-ae0c-616a90db9c6b@sessionmgr104&vid=0&format=EB&rid=1>

Buettner, L., Fitzimmons, S. & Barba, B. 2011. Animal-assisted therapy for Clients with Dementia. [Journal of Gerontological Nursing](#) ,37(5),10-14. Article from EBSCOHost. Accessed 15.03.2017

Borgi, M., Loliva, D., Cerino, S., Chiarotti, F., Venerosi, A., Bramini, M., Nonnis, E., Marcelli, M., Vinti, C., De Santis, C., Bisacco, F., Fagerlie, M., Frascarelli, M. & Cirulli, F., 2015. Effectiveness of a standardized equine-assisted therapy program for children with autism spectrum disorder. Journal of Autism and Developmental Disorders. 46(1), 1-9. Article from PubMed. Accessed 15.03.2017

Chashin, A., Gallagher, H., Newman, C. & Hughes, M. 2012. Autism and the Cognitive Processing Triad: A Case for Revising the Criteria in the Diagnostic and Statistical Manual. Journal of Child and Adolescent Psychiatric Nursing . 25(3) 141-148. Article from EBSCOHost. Accessed 16.01.2017. URL
<http://web.b.ebscohost.com/nelli.laurea.fi/ehost/pdfviewer/pdfviewer?sid=e1dab0c1-233a-4b32-900d-dd1269c61149%40sessionmgr103&vid=1&hid=107>

Christensen, D.L., Baio, J., Braun, K.N., Bilder, D., Charles, J., Constantino, J.N., Daniels, J., Durkin, M.S., Fitzgerald, R.T., Kurzius-Spencer, M., Lee, L.C., Pettygrove, S., Robinson, C., Schulz, E., Wells, C., Wingate, M.S., Zahorodny, W., Yeargin-Allsopp, M. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years. MMWR surveillance Summary. 65(3) 1-23. Accessed 17.2.2017.
<https://www.cdc.gov/mmwr/volumes/65/ss/ss6503a1.htm#suggestedcitation>

- College of Registered Nurses of Nova Scotia, 2015. Nursing plan of care (PDF version). Accessed 20.02.2017. URL <https://crnns.ca/wp-content/uploads/2015/12/Nursing-Plan-of-Care-Practice-Guideline.pdf>
- Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. *Journal of Advanced Nursing*. 62(1), 107-115
- Equator Network Online Wizard. ND. Have you remembered everything? Accessed 15.02.2017. <http://www.peneloperesearch.com/equator-wizard>
- Fung, C.S., 2015. Increasing the Social Communication of a Boy With Autism Using Animal-assisted Play Therapy: A Case Report. *Advances in mind-body medicine*. 29(3).27-31 . Article from EBSCOHost. Accessed 15.03.2017
- Fung, S. & Leung, A.S., 2014. Pilot study investigating the role of therapy dogs in facilitating social interaction among children with Autism. *Journal of Contemporary Psychotherapy*. 44(4), 253-262. Article from EBSCOHost. Accessed 15.3.2017.
- Gabriels, L.R., Agnew, J.A., Holt, K.D., Shoffner, A., Zhaoxing, P., Ruzzano, S., Clauton, G.H. & Mesibov, G., 2011. Pilot study measuring the effects of therapeutic horseback riding on school-age children and adolescents with autism spectrum disorders. *Research in Autism Spectrum Disorders*. 6(2). 578-588. Article from EBSCOHost. Accessed 15.3.2017.
- Gabriels, R.L., Pan, Z., Dechant, B., Agnew, J.A., Brim, N & Mesibov, G., 2015. Randomized Controlled Trial of Therapeutic Horseback Riding in Children and Adolescents With Autism Spectrum Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*. 54(7), 541-9. Article from EBSCOHost. Accessed 15.3.2017.
- Gunawan, J. 2015. Ensuring trustworthiness in qualitative research. *Gunawan J. Belitung Nursing Journal*. 2015 December. 1(1),10-11. Article from Helka. Accessed 10.5.2017.
- Holaday, B. 2012. History of Autism. *The South Carolina Nurse*.19(2), 12. South Carolina: ALD publishing agency. Accessed 17.01.2017. http://www.nursingald.com/uploads/publication/pdf/135/SC4_12.pdf
- Huttunen, M. 2015. Tietoa potilaalle: Autismi. Lääkärikirja Duodecim. Kustannus Oy Duodecim. Accessed 16.1.2017. http://www.terveysportti.fi.nelli.laurea.fi/dtk/ltk/koti?p_artikkeli=ykt00814&p_haku=autismi
- International Compliance Association, 2013. Academic malpractice. Accessed 09.03.2017. URL <https://www.int-comp.org/media/1879/academic-malpractice-oct-13.pdf>
- Jolly, A.A. 2015. Handle with Care: Top Ten Tips a Nurse Should Know Before Caring For a Hospitalized Child with Autism Spectrum Disorder. *Pediatric Nursing*. 41(1), 12. Article from EBSCOHost. Accessed 17.01.2017.
- Kanner L. 1949. Problems of nosology and psychodynamics in early childhood autism. *American Journal of Orthopsychiatry*. 19(3), 416-426.
- King, S. 2013. Guidelines for referencing. Laurea University of Applied Sciences. Accessed 13.03.2017. <https://laureaas.sharepoint.com/sites/linkfi/Dokumentit/Guidelines%20for%20referencing.pdf#search=reference%20guidelines>
- Kern, J., Fletcher, C.L., Mehta, J.A., Grannemann, B.D., Knox, K.R., Richardson, T.A. & Trivedi, M.H., 2011. Prospective Trial of Equine-assisted Activities in Autism Spectrum Disorder. *Journal of Alternative Therapies in Health and Medicine*. 17(3). 14-20. Article from Pub-Med. Accessed 15.3.2017.

Laurea Finna. ND. Article search ABC. Accessed 13.03.2017.

https://laurea.finna.fi/Content/artikkelihau_nohje

Matuszek, S. 2010. Animal-Facilitated Therapy in Various Patient Populations. *Holistic Nursing Practice* 24(4), 187-203. Article from PubMed. Accessed 10.12.2016.

Memishevikj, M. & Hodzhikj, S., 2010. The effects of equine-assisted therapy in improving the psychosocial functioning of children with autism. *The Journal of Special Education and Rehabilitation* 2010, Vol.11(3/4), 57-67. Article from PubMed. Accessed 15.3.2017

O'Haire, M., 2012. Animal-Assisted Intervention for Autism Spectrum Disorder: a Literature Review. *Journal of Autism and Developmental Disorders*. 43(7):1606-16022. Article from PubMed. Accessed 15.3.2017.

Opetus- ja kulttuuriministeriö, 2014. Valtioneuvoston asetus ammattikorkeakouluista. Finlex, 2014, Accessed on 09.03.2017. URL <http://finlex.fi/fi/laki/smur/2014/20141129>

Piek, J., Dawson, L., Smith, L., Gasson, N. 2008. The role of early fine and gross motor development on later motor and cognitive ability. *Human Movement Science*. 27(5), 668-681. Article from PubMed. Accessed 2.3.2017.

Resnik, D.B. 2015. What is Ethics in Research and Why is it Important? Article from PubMed. Accessed 09.03.2017. <http://www.niehs.nih.gov/research/resources/bioethics/whatis/>

Riley, D., Gagnier, J., Kienle, G., Moher, D., Plotnikoff, G., Shamseer, L., Barber, M. 2013. CARE CHECKLIST of information to include when writing a case report (online version). Accessed 15.02.2017. <http://www.care-statement.org/care-checklist.html>

Schuck, B. et al., 2016. Canine-assisted therapy for children with ADHD. *Journal of Attention Disorders*. 19(2), 125-137. Accessed on 31.01.2016.

https://laurea.finna.fi/PrimoRecord/pci.sagej10.1177_1087054713502080

The Australian Autism Alliance, ND. Establishing routines. Accessed on 06.03.2017.

<https://www.autismspectrum.org.au/content/establishing-routines>

The National Autistic Society, 2011. Classroom and playground: support for children with autism spectrum disorders. Accessed on 06.03.2016.

http://www.autism.org.uk/~media/nas/e-commerce/promotions%202011/classroom_and_playground.ashx

Vanhala, R. 2016: Autismikirjon häiriöt. Lääkärin käsikirja. Kustannus Oy Duodecim. Accessed 16.01.2017.

http://www.terveysportti.fi.nelli.laurea.fi/dtk/ltk/koti?p_artikkeli=ykt00814&p_haku=autismi

Ward, S.C., Whalon, K., Rusknak, K., Wendell, K. & Paschall, N., 2013. The Association Between Therapeutic Horseback Riding and the Social Communication and Sensory Reactions of Children with Autism. *Journal of Autism and Developmental Disorders*. 43(9). 2190-2198. Article from EBSCOHost. Accessed 15.5.2017.

World Health Organization, 2017. ICD-11 (Draft). Online version. Accessed 17.01.2017.

<http://apps.who.int/classifications/icd11/browse/l-m/en#/>

World Health Organization, 2016. Autism spectrum disorders: Fact sheet. Accessed

16/01/2016. <http://www.who.int/mediacentre/factsheets/autism-spectrum-disorders/en/>

Figures

Figure 1:	7
Figure 2:	13
Figure 3:	16
Figure 4:	17

Tables

Table 1:	12
Table 2:	14