

Evaluation of the effectiveness of canine assisted therapy as a complementary method of rehabilitation in disabled children

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Abstract

Introduction. The aim of the study was to evaluate the effectiveness of canine assisted therapy as a complementary method of rehabilitation in children with developmental disabilities.

Methods. Overall, 39 children with a disability, of both sexes, aged 4–9 years took part in the study. The diagnostic survey was used as a method, the research tool was a survey that consisted of 23 questions. The survey was to be filled in by the parents.

Results. Canine assisted therapy turned out the most effective one in attention-focussing (94%), developing mobility (92%) and motor function (90%), improving downtime (92%), achieving balance and coordination (84%), and finding a way to show affection (83%). Therapeutic benefits were also observed in the children's emotional and social sphere.

Conclusions. Canine assisted therapy has a major impact on improving balance, coordination, and motor skills. The closeness of the animal makes children quiet and relaxed. Canine assisted therapy contributes to the reduction of aggressive behaviour and increases awareness. It is an effective and recommendable complementary method of rehabilitation for children with intellectual and motor disorders.

Key words: autism, cerebral palsy, developmental disabilities, animal assisted therapy, canine assisted therapy

Introduction

Nowadays, an appropriately developed rehabilitation programme plays a leading role in the stimulation of the psychomotor development of children with disabilities. Teams of specialists, including physicians, physiotherapists, psychologists, speech therapists, try to apply the latest methods of work and therapeutic procedures which would significantly improve the functional condition of their patients. Such innovative complementary forms of rehabilitation for children with numerous developmental deficits include canine assisted therapy, which by creating a relationship with a dog combines play, education, and revalidation.

Analysing the situation of disabled children in the society, we can notice that they are often discriminated against because of 'being different,' and the surrounding environment treats them with prejudice as disabilities arouse reluctance and disgust. Yet, in accordance with the Convention on the Rights of the Child adopted by the United Nations, 'a mentally or physically disabled child should enjoy a full and decent life, in conditions which ensure dignity, promote self-reliance and facilitate the child's active participation in the community' [1, Art. 23]. Unfortunately, often people focus on children's deficits and judge them by their disabilities, failing to consider their actual skills. An additional negative aspect is the current quick pace of life and the tendency to focus on material values. This causes loneliness and rejection of dependent children, as their parents are too tired with their daily duties to pay attention to their disabled children and deepen their emotional relationship with them.

Here we can consider whether there is an association between canine assisted therapy and disability. The answer is

obvious. Closeness with a dog can work miracles. A dog is a creature who does not laugh at anybody, who does not judge, but accepts; it does not require or expect, but it gives; it does not forbid or order around, but motivates. Most of all, however, a dog does not have any conditions – it loves unconditionally, spontaneously showing its feelings. A dog becomes a therapist, a teacher, a guardian, and a hero for the child, while the task of adults is only to ensure better conditions for development adjusted to the child's possibilities, needs, and interests [2].

Canine assisted therapy is one of the types of animal assisted therapy, together with equine assisted therapy (therapy with the participation of horses), feline assisted therapy (therapy with the participation of cats), as well as dolphin therapy or pet therapy (therapy involving alpacas, rabbits, hamsters, or birds). With reference to canine assisted therapy, the following terms are also applied: dog therapy, kynotherapy, canistherapy, and contact therapy, but they are all synonymous – they mean working with a dog and share the same goal [3].

From a wider perspective, canine assisted therapy is 'treatment through contact with a dog – kind, friendly, loyal, committed, soft and fluffy' [4, p. 92]. The definition of canine assisted therapy formally approved by the Przyjaciół Foundation assumes that it is a contract therapy with the participation of a dog involving multi-profile improvement of children and adults. It is a type of work complementing broadly understood rehabilitation and it cannot be the only form of therapy. It constitutes complementation of all therapeutic impacts, in particular in the case of developmentally challenged children. In healthy people, it is an element of educational impacts [5]. Another definition, suggested by the Polish Kyno-

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therapeutic Society, says that 'kynotherapy is a method that enhances effectiveness of personality development, education, and rehabilitation, in which an appropriately selected and trained dog is a motivator; it is carried out by a qualified kynotherapist' [6].

The purpose of canine assisted therapy is to complement a traditional rehabilitation programme, and thanks to a large number of available therapeutic plans, it is addressed to a large group of patients. Among the recipients of canine assisted therapy there can be children with intellectual and physical disabilities of various degrees, autism spectrum disorders, attention deficit hyperactivity disorder (ADHD), Down syndrome, cerebral palsy, epilepsy, speech disorders; people with complications of past injuries and diseases, with damages to the hearing or sight organ; people who feel lonely; elderly people; those suffering from mental illnesses and socially maladjusted. The only contraindications to applying such therapy are allergic reactions to canine saliva, dander, or epidermis [3, 7, 8].

The main idea of canine assisted therapy is to develop and implement a programme of classes adjusted to the individual possibilities and needs of patients. The methodology is arranged in cooperation with a physician and physiotherapist and it is aimed at achieving specific therapeutic goals, among which there are mental, physical, educational, and motivational ones.

Summarizing, canine assisted therapy helps eliminate motor dysfunctions, impacts mental development, shapes the psyche, and improves social skills. A factor intensely motivating during the process is a dog, whose closeness leads a child to numerous beneficial behaviours and emotions. Overcoming difficulties, crossing one's barriers, as well as reducing aggression, anxiety, and stress are often the only purposes, but the therapy constitutes a great step forward in establishing a child's contact with the world [9].

Canine assisted therapy as a method supporting rehabilitation both in Poland and in the world still remains at the developmental stage. In current literature, there is still little information concerning the effectiveness of dog therapy in the rehabilitation of children with various disabilities. Available publications are mostly illustrative works presenting the idea of therapy with the participation of a dog – the possibilities, principles, and methods of its application – or the results of studies based on experience and authors' own observations. Reliable literature involving objective scientific research which would present specific results of the therapy in various spheres of functioning of children with intellectual or physical disabilities is still missing [10, 11]. Also, there are no publications which would assess the therapeutic effectiveness of canine assisted therapy from the perspective of parents, whose opinion is the most measurable here. Spending most time with their children during the day, they are able to see even the

slightest changes in their functioning or behaviours, which may be not visible to therapists or educators.

The objective of this article was to evaluate the effectiveness of canine assisted therapy as a complementary method in the rehabilitation process of children aged 4–9 with developmental disabilities. To study the problem, the following research questions were asked:

1. Does canine assisted therapy affect improvement of balance, coordination, and motor skills?
2. Do classes with the participation of a dog result in downtime improvement?
3. Does canine assisted therapy contribute to enhancing cause and effect thinking?
4. Does canine assisted therapy reduce aggressive behaviours?
5. Is canine assisted therapy, as a complementary method in the rehabilitation process, worth recommending?

Subjects and methods

The study was conducted in the kindergarten of the Special Educational Centre in Wroclaw after obtaining consent of the head of the institution. It involved a group of 39 children with disabilities (19 boys and 20 girls) aged 4–9 years. All children were under constant care of physicians and physiotherapists, and they participated in canine assisted therapy classes, which complemented the traditional rehabilitation process. A mild degree of disability occurred in 3 children, moderate in 19 children, and significant in 17 children. The children participating in canine assisted therapy were diagnosed with autism (12), speech disorders (9), intellectual disability (7), cerebral palsy (7), and ADHD (4). Most subjects (36) took part in canine assisted therapy with the participation of a dog once a week. Most often, the children were involved in group canine assisted therapy (33), and the classes lasted 30 minutes (35). The period of the therapy was diverse and equalled 2–3 years in the case of 18 children, 1–2 years in 12 children, and less than a year in 9 children (Tables 1, 2).

As a research method, a diagnostic survey was also used, while a research tool was the authors' survey consisting of 23 questions, filled in by parents of the children with disabilities. Owing to the lack of standardized questionnaires evaluating the effectiveness of canine assisted therapy in the rehabilitation process, a survey created on the basis of other authors' surveys available online was used [12, 13].

The first part of the survey concerned information about the participants (sex, cause for participating in canine assisted therapy, time, form and frequency of classes, the diagnosed degree of disability, behaviour during therapy). In the second part, parents were to evaluate the results of canine assisted therapy by providing answers to questions referring to improvement in terms of motor functioning, muscle tension,

Table 1. Characteristics of study participants

Number of study group	Number of participants	Gender	Disability type	Degree of disability
1	12	5 female and 7 male	Autism	7 moderate and 5 significant
2	9	6 female and 3 male	Speech disorder	1 mild, 5 moderate, and 3 significant
3	7	4 female and 3 male	Cerebral palsy	1 mild, 2 moderate, and 4 significant
4	7	4 female and 3 male	Intellectual disability	4 moderate and 3 significant
5	4	1 female and 3 male	Attention deficit hyperactivity disorder (ADHD)	1 mild, 1 moderate, and 2 significant

Table 2. Description of study groups

Number of study group	Patients' occupational needs	Activities with canine assisted therapy	Expected therapy results
1 (autism)	Improvement in interpersonal relationship with friends, parents, and teachers, development of the emotional sphere	Pointing the body parts on oneself and on the dog, playing in front of the mirror – watching own silhouette and that of the dog, listening to the dog's heartbeat, blowing on the dog's fur, searching for a hidden child by the dog, throwing toys to the dog	Improvement of attention, emotional condition, expressing emotions and feelings, social skills
2 (speech disorder)	Speech development, learning new words, increasing the motivation of the child to communicate with other people	Collecting dog's toys (give me a ball), searching for items near the dog, noticing opposites, verbal and pictorial stories	Improvement in verbal communication (words)
3 (cerebral palsy)	Increasing active movements, using both sides of the body, improvement of the quality of life by being more independent	Mimicking the way the dog moves (walking, lying, sitting, crawling, serving), throwing the ball to the dog, stroking the dog's hair, feeding the dog with a teaspoon, combing the dog, exercise with clothes (tying a scarf, pulling socks)	Improvement of locomotor skills, balance and coordination, motor functioning; reduction of muscle tension
4 (intellectual disorder)	Development of visual and visuospatial perception, improvement of depth perception	Listening to stories, cartoons, attempts to combine pictures into a logical whole, segregating dog's toys and other objects, exercising: fastening a dog leash – 'we go outside,' putting dog's food in a bowl – eating time, turning off the light – the dog goes to sleep, pointing at animals on pictures based on the heard name, matching pairs of the same pictures	Improvement of cause and effect thinking
5 (attention deficit hyperactivity disorder, (ADHD))	Reduction in fear, anxiety, and stress, relaxation of the body, improvement of attention	Blowing water in a dog's bowl, imitating dog's panting, listening to the sound of a breathing or sleeping dog, finding hidden objects, using games that require attention and concentration, e.g. building by pattern, inserting different sizes of delicacies into openings in a suitable size box	Reduction in the level of aggression, improvement of downtime

balance and coordination, cause and effect thinking, expression of emotions and feelings, level of aggression, downtime, and verbal communication. The last part of the survey aimed at establishing if thanks to canine assisted therapy the children willingly participated in the rehabilitation process, if their progress was satisfying for parents and if canine assisted therapy as a method supporting traditional rehabilitation was worth attention and recommendation.

The study results are presented in tables.

Statistical analysis

The statistical analysis of the data was performed with the Statistica software. The chi-squared test allowed inferential statistical analysis. Here, the results were considered statistically significant at $p \leq 0.05$, showing statistical dependence.

Ethical approval

The research related to human use has been complied with all the relevant national regulations and institutional policies, has followed the tenets of the Declaration of Helsinki, and has

been approved by the authors' institutional review board or an equivalent committee.

Informed consent

Informed consent has been obtained from the legal guardians of all individuals included in this study.

Results

In the second part of the survey, questions aimed at obtaining information about the results of canine assisted therapy the physical, intellectual, and emotional sphere.

Improvement in terms of locomotor possibilities due to canine assisted therapy was observed by the parents of 92% of participants, while the remaining 8% did not know whether there was any improvement in their children's manner of movement (Table 3).

In 92% of the studied participants, canine assisted therapy contributed to greater downtime in everyday life, in 3% there was no improvement, and 5% of parents said that they did not know whether downtime improvement was caused by canine assisted therapy (Table 4).

Table 3. Impact of canine assisted therapy on locomotor skills improvement

Disability type	Definitely yes	Rather yes	I don't know
Autism	4	5	3
Speech disorder	4	5	0
Cerebral palsy	2	5	0
Intellectual disability	3	4	0
Attention deficit hyperactivity disorder (ADHD)	1	3	0
Total (n)	14	22	3
Total (%)	35.9	56.4	7.7
Chi-squared test	$\chi^2 = 8.27; p = 0.4070$		

Table 4. Impact of canine assisted therapy on downtime improvement

Disability type	Definitely yes	Rather yes	I don't know	Rather not
Autism	2	7	2	1
Speech disorder	4	5	0	0
Cerebral palsy	2	5	0	0
Intellectual disability	1	6	0	0
Attention deficit hyperactivity disorder (ADHD)	2	2	0	0
Total (n)	11	25	2	1
Total (%)	28.21	64.1	5.13	2.56
Chi-squared test	$\chi^2 = 10.17; p = 0.6010$			

Table 5. Impact of canine assisted therapy on verbal communication (words) improvement

Disability type	Definitely yes	Rather yes	I don't know	Rather not	Definitely not
Autism	2	5	1	3	1
Speech disorder	2	4	0	3	0
Cerebral palsy	1	1	1	4	0
Intellectual disability	0	3	2	2	0
Attention deficit hyperactivity disorder (ADHD)	0	2	1	1	0
Total (n)	5	15	5	13	1
Total (%)	12.82	38.46	12.82	33.33	2.56
Chi-squared test	$\chi^2 = 10.52; p = 0.8376$				

Table 6. Impact of canine assisted therapy on balance and coordination improvement

Disability type	Definitely yes	Rather yes	I don't know
Autism	6	5	1
Speech disorder	3	5	1
Cerebral palsy	0	5	2
Intellectual disability	3	3	1
Attention deficit hyperactivity disorder (ADHD)	1	2	1
Total (n)	13	20	6
Total (%)	33.33	51.28	15.38
Chi-squared test	$\chi^2 = 6.03; p = 0.6428$		

Improvement in verbal communication occurred in 49% of participants. In 13%, it was not certain whether improvement took place, while 36% of parents said that there were no changes (Table 5).

Noticeable improvement in balance and coordination was reported in 84% of children participating in canine assisted therapy, while 15% of parents were not certain whether canine assisted therapy contributed to improvement in stability and balance (Table 6).

A positive impact on developing attention to currently performed tasks was observed in 94% of participants; in 5% there was no certainty concerning improvement (Table 7).

The impact of canine assisted therapy on improvement in the emotional functioning was observed in 82% of children by their parents, no improvement was reported by 8%, and 10% of the respondents were not able to say whether the

change in their child's temper was caused by canine assisted therapy (Table 8).

Visible improvement in the motor functioning was observed in 90% of participants, while in 3% of children no improvement was observed, and 8% of parents were not certain whether canine assisted therapy contributed to motor functioning improvement (Table 9).

Reduction in the increased muscle tension in upper and lower limbs was observed in 51% of children participating in canine assisted therapy, no improvement was declared by 20% of parents, while in 28% it was not certain whether canine assisted therapy affected regulation of muscle tension (Table 10).

Improvement of one of the basic forms of thinking (cause and effect thinking) as expressed in the dependencies between the participants' actions and dogs' behaviours, e.g.

Table 7. Impact of canine assisted therapy on attention improvement

Disability type	Definitely yes	Rather yes	I don't know
Autism	2	8	2
Speech disorder	0	7	0
Cerebral palsy	2	7	0
Intellectual disability	1	6	0
Attention deficit hyperactivity disorder (ADHD)	1	3	0
Total (n)	6	31	2
Total (%)	15.38	79.49	5.13
Chi-squared test	$\chi^2 = 6.77; p = 0.5610$		

Table 8. Impact of canine assisted therapy on the emotional condition improvement

Disability type	Definitely yes	Rather yes	I don't know	Rather not
Autism	2	6	4	0
Speech disorder	4	5	0	0
Cerebral palsy	3	3	0	1
Intellectual disability	1	5	0	1
Attention deficit hyperactivity disorder (ADHD)	1	2	0	1
Total (n)	11	21	4	3
Total (%)	28.21	53.85	10.26	7.69
Chi-squared test	$\chi^2 = 16.00; p = 0.1908$			

Table 9. Impact of canine assisted therapy on motor functioning improvement

Disability type	Definitely yes	Rather yes	I don't know	Rather not
Autism	2	6	3	1
Speech disorder	5	4	0	0
Cerebral palsy	2	5	0	0
Intellectual disability	2	5	0	0
Attention deficit hyperactivity disorder (ADHD)	1	3	0	0
Total (n)	12	23	3	1
Total (%)	30.77	58.97	7.69	2.56
Chi-squared test	$\chi^2 = 12.66; p = 0.3937$			

Table 10. Impact of canine assisted therapy on muscle tension reduction

Disability type	Definitely yes	Rather yes	I don't know	Rather not	Definitely not
Autism	0	7	4	0	1
Speech disorder	1	4	2	0	2
Cerebral palsy	2	1	2	2	0
Intellectual disability	0	2	3	1	1
Attention deficit hyperactivity disorder (ADHD)	1	2	0	1	0
Total (n)	4	16	11	4	4
Total (%)	10.26	41.03	28.21	10.26	10.26
Chi-squared test	$\chi^2 = 17.38; p = 0.3611$				

Table 11. Impact of canine assisted therapy on cause and effect thinking improvement

Disability type	Definitely yes	Rather yes	I don't know	Rather not
Autism	4	5	2	1
Speech disorder	3	4	1	1
Cerebral palsy	1	2	2	2
Intellectual disability	0	3	2	2
Attention deficit hyperactivity disorder (ADHD)	1	1	1	1
Total (n)	9	15	8	7
Total (%)	23.08	38.46	20.51	17.95
Chi-squared test	$\chi^2 = 6.13; p = 0.9093$			

Table 12. Impact of canine assisted therapy on improvement in expressing emotions and feelings

Disability type	Definitely yes	Rather yes	I don't know
Autism	3	6	3
Speech disorder	3	6	0
Cerebral palsy	1	5	1
Intellectual disability	1	4	2
Attention deficit hyperactivity disorder (ADHD)	0	3	1
Total (n)	8	24	7
Total (%)	20.51	61.54	17.95
Chi-squared test	$\chi^2 = 5.02; p = 0.7549$		

reaching out a hand makes the dog approach, putting on a collar means going for a walk, was declared by 61% of parents, 18% did not observe any improvement in this aspect, and 21% of the respondents could not tell (Table 11).

A positive impact of canine assisted therapy on learning to better express one's feelings and emotions was observed by 82% of parents, while the remaining 18% could not clearly tell whether the change in terms of expressing oneself was caused by canine assisted therapy (Table 12).

Reduction in the level of aggression was observed in 46% of participants, in 33% of cases the level of excessive anger did not change, and 21% of parents responded that they did not know whether a smaller frequency of aggressive behaviour resulted from canine assisted therapy (Table 13).

Improvement in terms of social skills was observed by 72% of parents, no results were noted by 13% of parents,

while uncertainty in terms of improvement was stated by 15% of parents (Table 14).

The last series of questions in the survey aimed at summarizing and expressing parents' opinions on the effectiveness of canine assisted therapy as an element of the entire improvement programme for children. In all children (n = 39) participating in the studies, canine assisted therapy caused a change in the attitude to a long-term rehabilitation process and an increase in the will to actively participate in it. Satisfaction from the results brought by canine assisted therapy in each sphere of the children's life – physical, intellectual, and emotional – as well as recommendation of canine assisted therapy as a method complementing the rehabilitation process for children with disabilities were declared by all parents of the studied children (n = 39) (Tables 15–17).

Table 13. Impact of canine assisted therapy on aggression reduction

Disability type	Definitely yes	Rather yes	I don't know	Rather not	Definitely not
Autism	2	6	1	3	0
Speech disorder	1	2	3	2	1
Cerebral palsy	0	4	1	1	1
Intellectual disability	0	2	2	3	0
Attention deficit hyperactivity disorder (ADHD)	0	1	1	2	0
Total (n)	3	15	8	11	2
Total (%)	7.69	38.46	20.51	28.21	5.13
Chi-squared test	$\chi^2 = 11.59; p = 0.7715$				

Table 14. Impact of canine assisted therapy on improvement in the level of social skills

Disability type	Definitely yes	Rather yes	I don't know	Rather not
Autism	3	7	1	1
Speech disorder	2	4	0	3
Cerebral palsy	0	3	3	1
Intellectual disability	0	6	1	0
Attention deficit hyperactivity disorder (ADHD)	2	1	1	0
Total (n)	7	21	6	5
Total (%)	17.95	53.85	15.38	12.82
Chi-squared test	$\chi^2 = 17.53; p = 0.1306$			

Table 15. Increase of the children's willingness to participate in rehabilitation

Disability type	Definitely yes	Rather yes
Autism	6	6
Speech disorder	4	5
Cerebral palsy	1	6
Intellectual disability	1	6
Attention deficit hyperactivity disorder (ADHD)	2	2
Total (n)	14	25
Total (%)	35.9	64.1
Chi-squared test	$\chi^2 = 4.51; p = 0.3413$	

Table 16. Satisfaction from the results of canine assisted therapy

Disability type	Definitely yes	Rather yes
Autism	5	7
Speech disorder	4	5
Cerebral palsy	3	4
Intellectual disability	1	6
Attention deficit hyperactivity disorder (ADHD)	1	3
Total (n)	14	25
Total (%)	35.9	64.1
Chi-squared test	$\chi^2 = 2.23; p = 0.6928$	

Table 17. Recommendation of canine assisted therapy

Disability type	Definitely yes	Rather yes
Autism	8	4
Speech disorder	6	3
Cerebral palsy	3	4
Intellectual disability	2	5
Attention deficit hyperactivity disorder (ADHD)	1	3
Total (n)	20	19
Total (%)	48.72	51.28
Chi-squared test	$\chi^2 = 4.73; p = 0.3150$	

Discussion

Animal assisted therapy has not become very popular in Poland, and the awareness of its potential as an element of a therapeutic programme is limited. An unquestionable benefit of all types of pet therapy is their positive impact on the emotional and social sphere. Closeness of animals not only reduces stress, anxiety, unrest, but also decreases the feeling of being lonely, improves mood, facilitates expression of emotions, and helps develop social interactions and communication [14–16].

Literature on canine assisted therapy is insufficient and not well-ordered. Most authors include studies in their works which are based on their experience and observations as well as on not sufficiently objective reports of therapists organizing canine assisted therapy. A significant problem also involves the lack of adequate methods used to evaluate empirical research, which affects the reliability of therapy results. Another complication in determining the effectiveness of canine assisted therapy is the fact that most often it is not the only therapeutic method applied in the rehabilitation of people with disabilities.

Currently, in the context of a quick development of canine assisted therapy and an increasing interest in the method, numerous authors have tried to carry out objective and accurate studies confirming the effectiveness of canine assisted therapy. The World Health Organization formally acknowledged a beneficial impact of closeness of animals on human health, in particular in treating mental illnesses, cardiovascular diseases, ailments of old age, and pain [17].

In the authors' studies, an attempt was made to evaluate the effectiveness of canine assisted therapy as a complementary method in the rehabilitation process of children with physical and intellectual disabilities. The results indicate that canine assisted therapy brought the greatest effects in terms of attention (94%), locomotor skills (92%), motor functioning (90%), downtime improvement (92%), balance and coordination (84%), and the manner of expressing feelings by children (83%). Therapeutic benefits were also observed in the emotional and social sphere.

Very similar studies were conducted by Nawrocka-Rohnka [8], who focused on the assessment of the impact of canine assisted therapy on children with developmental disorders. Overall, 23 children (boys and girls) aged 2–10 years participated in the study. They suffered from various developmental disorders, such as autism, Asperger syndrome, intellectual disability, general developmental disorders, cerebral palsy, meningomyelocele, or anaplastic glioma. The study indicated visible improvement in various spheres of the children's development. A progress in the openness to new situations, in skills to enter relationships with a dog or a therapist, and in verbal communication was observed in children with mental disability and autism, while improvement in locomotor skills referred only to patients with cerebral palsy and meningomyelocele.

Positive aspects of canine assisted therapy were also observed by Boguszewski et al. [17]. Their study involved 36 children with Down syndrome, whose average age equalled 11.2 years. Two groups were created: (1) the study group, consisting of 19 children who participated in canine assisted therapy; (2) the control group of 17 children who did not participate in any additional classes. In 95% of the canine assisted therapy subjects, improvement in terms of communication was observed. Additionally, children from group 1 experienced a significant increase of self-confidence (89%), vocabulary extension (42%), as well as improvement in the

expression of feelings and emotions (37%). Children participating in canine assisted therapy performed most daily activities, such as moving, sitting, getting up, independently or with a small assistance of third persons, while those from the control group could not get dressed or deal with physiological needs on their own. Differences between groups 1 and 2 were statistically significant.

Benefits from pet therapy included in a therapeutic programme were also shown by Elmaci and Cevizci [18], who evaluated the impact of canine assisted therapy and activity in rehabilitation of children with cerebral palsy and physical and mental disabilities. Ten children divided into 5 research groups participated in the study. The assumed goals were achieved in all groups. Children experiencing fear, anxiety, and difficulties due to their disabilities in daily life learnt to deal with their concerns, set their goals, and planned how to achieve them. During the study, children improved their skills to use their body in accordance with their possibilities. Additionally, they developed their empathic and communication skills, and canine assisted therapy helped them learn to obtain and give help.

Yap et al. [19] presented the perception and state-of-the-art among employees of the Royal Children's Hospital in Melbourne, Australia, concerning the application of animal assisted therapy in rehabilitation of disabled children, in particular children with cerebral palsy, autism spectrum disorders, and brain damage. The participants were recruited through an Internet bulletin available only for the hospital employees. In total, 128 employees of the hospital participated in the study. Out of these, 88% had heard about animal assisted therapy; however, half of them said that their knowledge about animal assisted therapy was limited. Nearly all respondents believed that animal assisted therapy would be helpful in rehabilitation of children suffering from cerebral palsy (98%), autism spectrum disorders (99%), and acquired brain damage (96%). In the conducted study, it was suggested that in the case of children with cerebral palsy, an animal would help in physical rehabilitation, encouraging the child to move. With regards to children with autism spectrum disorders and brain damage, it was indicated that animals could support emotional regulation, having a calming and relaxing influence and decreasing the intensity and frequency of aggressive behaviours. Among the benefits of animal assisted therapy included in the therapeutic proceedings at the hospital, the respondents also listed: improvement of mood, increased motivation, decreased feeling of loneliness, and facilitated social interaction and communication.

The beneficial effects of canine assisted therapy on the improvement of well-being and quality of life in hospitalized children were confirmed by Braun et al. [20], who focused on capturing changes in the perception of pain among children aged 3–17 years. Their study participants were divided into 2 groups – the intervention group and the control group. The former consisted of 18 subjects who participated in animal assisted therapy with a dog for 15–20 minutes. The latter group involved 39 children who were asked to sit in silence for 15 minutes. In both groups, before applying the given protocol, blood pressure and heart beat were taken, frequency of breaths was measured, and the level of pain was determined. The examinations and measurements were repeated after 15 minutes. In the studied group, differences in the level of pain were lower after the task; however, reduction of pain was 4 times higher in children who participated in animal assisted therapy as compared with those who relaxed in silence for 15 minutes. The pain reduction was similar to that observed after oral administration of paracetamol.

Calcaterra et al. [21] observed that animal assisted therapy positively affected neurological, cardiovascular, and endocrine indices in children exposed to stress and pain in the immediate postoperative period. Their study involve 40 children (boys and girls) aged 3–17 years. The patients were randomly assigned to 2 groups, 20 subjects each. In the first group, after a surgical procedure, children underwent 20-minute animal assisted therapy, while in the second group, standard postoperative care was applied. To obtain the results, EEG was performed, heart beat and blood pressure were taken, saturation was checked, hemodynamic activity of the brain concerning changes in oxygen concentration in the prefrontal brain areas was checked with near infrared spectroscopy, salivary cortisol levels were measured, and the visual pain scale was applied. In the animal assisted therapy group, lower pain sensation was observed in comparison with the standard postoperative care group. Additionally, animal assisted therapy resulted in increased alertness and activity after general anaesthesia, caused emotional reactions in the prefrontal areas of the cerebral cortex, and induced an adaptation response of the cardiovascular system.

An invaluable role of a dog assisting the daily activity of children with autism spectrum disorders and its positive impact on the functioning of the family were also proved by Burgoyne et al. [22]. They conducted a study among 134 parents whose children had therapy dogs and among 87 parents being on the list of people waiting for an animal to be assigned to them. The study indicated that parents of children with autism spectrum disorders perceived having a therapy dog as valuable in treating their child's disease. In comparison with the parents waiting for a therapy dog, guardians who already had a dog believed that their children were less exposed to threats related to the external environment and that they were perceived more positively and treated with respect by other people; these parents also felt more competent caring for their children. The participants also suggested that the presence of a therapy dog facilitated normal functioning of the family – the dog ensured the child's safety during their stay at a shopping centre and prevented the child from feeling anxious and left alone when the parents were at work. Among the benefits of having a dog, the parents also mentioned its positive impact on their child's downtime and assistance in making friends.

In their elaboration, Schuck et al. [23] provide initial results concerning the effectiveness of animal assisted therapy in the case of children with ADHD aged 7–9. The research project involved 24 children who were randomly assigned to one of 2 therapeutic groups: a group with behavioural and cognitive therapy and canine assisted intervention and a group with behavioural and cognitive therapy without canine assisted intervention; mascot dogs were used for the intervention. In both therapeutic groups – with and without canine assisted intervention – parents reported improvement in terms of developing social skills and prosocial behaviour, as well as improved concentration, attention, and focus on currently performed actions. In all studied patients, the severity of ADHD symptoms showed a linear decrease during the course of therapy; however, in children who participated in dog therapy, the symptoms of the disease occurred much less frequently in comparison with those who only underwent behavioural and cognitive therapy, without animal assistance.

Limitations

The study has some limitations. First, it is limited to 39 cases. We could not compare our results with those obtained in a control group that included patients working without canine assisted therapy. Further studies should assess whether canine assisted therapy in children with disabilities has a superior effect compared with other therapy models. The second limitation consists in the fact that data collection was limited to interviews and observations.

Conclusions

The analysis of the obtained results allows to draw the following conclusions:

1. Canine assisted therapy affects improvement in balance, coordination, and motor skills of children with disabilities.
2. Closeness of an animal during therapy calms children down and relaxes them.
3. It cannot be clearly stated whether canine assisted therapy contributes to the improvement of cause and effect thinking.
4. Canine assisted therapy reduces aggressive behaviours in children with developmental disorders to a small extent.
5. Canine assisted therapy is worth recommendation as an effective method complementing the rehabilitation process of children with intellectual and physical disabilities.

Disclosure statement

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Conflict of interest

The authors state no conflict of interest.

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