SOCIETY. INTEGRATION. EDUCATION
Proceedings of the International Scientific Conference. Volume III, May 24th -25th, 2019. 94-106

THE PSYCHOSOCIAL EFFECT OF THERAPEUTIC ACTIVITIES WITH DOLPHINS FOR CHILDREN WITH DISABILITIES

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Abstract. *The aim of this study was to compare the results of the psychosocial effect of therapeutic activities with dolphins for children with cerebral palsy, Down syndrome and autism. Research was carried out in the Dolphin Assisted Therapy Center. Ten families raising children with disabilities took part in this research. Methods: Chandler's Psychosocial Session Form, interviews before, two weeks and one month after therapeutic activities with dolphins. The research results brought to the light statistically significant changes in the psychoemotional and behavioral patterns for children with qualitative differences depending on child's diagnostic characteristics. The greater positive results were noted by parents, as well as statistically significant measured in autism, but the least in Down syndrome case. The research results revealed that parents shaped their expectations on the impact of therapeutic activities basing on the normalization perspective. Narrative results revealed that all parents raising children with disabilities had needs of re-establishing the inner sense of coherence of the whole family system.*
Keywords: *autism, Down syndrome, cerebral palsy, therapeutic activities with dolphins.*

Introduction

Animals have always been playing an important role in human's life (All and Loving, 1999; Hatch, 2007). Even in ancient Greece it was mentioned that a contact with animals helped to improve the emotional and physical condition for people (Macauley, 2006; Nimer & Lundahl, 2007); despite this fact, animals have only been used for therapeutic purposes since the end of the 18th century (Kreivinienė & Kleiva, 2017; Macauley, 2006). If scientific studies on canitherapy (Binfet, 2017; Cipriani et al., 2013; Ginex et al., 2018) or

http://dx.doi.org/10.17770/sie2019vol3.3850

hippotherapy (Hsien et al., 2017; Kwon et al., 2015; Žalienė et al., 2018) are usually related to the psychoemotional and motor support to people with disabilities, the studies investigating the dolphin-assisted therapy (Curtis, 2000; Brakes & Williamson, 2007; Kreivinienė & Rugevičius, 2009; Acquaviva et al., 2003; Brensing et al., 2005; Kreivinienė & Kleiva, 2017) deal with the changes in the sensory, psychoemotional, motor spheres. Despite large numbers of scientific studies (from Nathanson, 1980, 1989, 1998; Nathanson et al., 1997; Brensing, Linke et al., 2005; Lukina, 2005 to Taylor & Carter, 2018; Candelieri, 2018), the investigation of the dolphin-assisted therapy being carried out are usually characteristic of the depth of research, but not of representative samples due to the limitations of these therapeutic activities.

The Psychosocial Situation of Families and Support Methods

The psychosocial situation of families raising children with disabilities is complex because a family faces many challenges, depending on complexity of child's disability. Disability or health issues of one family member affect the welfare of all the family, especially in child's chronic illness situation (Smith et al., 2002). For example, a research conducted by Brajtman (2003, 454) revealed that families in severe disability situations were affected by many issues, like anxiety; another research conducted by Margalit et al. (1992, 202) brought to the light such issues as avoidant coping, lower sense of coherence, less emphasis on family members' interrelations and personal growth. Therefore, a study of Carpenter (2007, 176), showing that families in severe disability situations require support during their life cycle, presupposes their search for complementary and alternative medicine (CAM) services. The dolphin-assisted therapy (DAT) is one of such methods. Dolphin-assisted therapy is practiced in many countries having different backgrounds and employing various methodologies. In Lithuania, the dolphin-assisted therapy is being practiced in the Lithuanian Sea Museum alongside with evidence-based scientific research since 2001. Even though DAT encompasses methods of social pedagogy, social work, special education, psychology, occupational therapy, and physiotherapy, in 2013 a hygiene norm for dolphinariums (LR Sveikatos apsaugos ministro įsakymas, Lietuvos higienos norma HN 133: 2013) was released as a precondition to medical licensing as a method of CAM services by the Ministry of Health.

Recent research (Ravindran & Myers, 2012) highlights the striving of families for balance; therefore, their life cycle is perceived as a difficult existential experience. Despite the severity of a disability, parents always are the addressed link in care, supervision, and education. Burnouts because of longitudinal stress and taking a toll on mental and physical health are reducing family resources likewise the reactions of family members are different depending on a diagnostic

type, such as the acceptance process for parents of a child with physical disability is easier in comparison to mental disabilities. Therefore, family seeks recharging and support from complementary methods. Research studies show that CAM is sought for when: families believe that it is a safe method of wellness or traditional methods do not help, or in chronic disability cases when families undergo discomfort, chronic pain, depression, tiredness (Kreivinienė & Kleiva, 2017). Scientific research works demonstrate that in a case of Down syndrome some 87 per cent of families search for CAM support, in a case of autism spectrum – 50 per cent, in a case of cerebral palsy – 56 per cent, in attention-deficit/ hyperactivity disorder (ADHD) – 54 per cent (Hyman & Levy, 2005). Because of this reason, the psychosocial effect on children with Down syndrome, cerebral palsy and autism as well as the effect of the dolphin-assisted therapy on family have been investigated.

Methodology

The research aim is to compare the results of the psychosocial effect of therapeutic activities with dolphins for children with cerebral palsy, Down syndrome and autism.

Research participants. The research was conducted from November 2016 to May 2017 in the Dolphin-Assisted Therapy Center of the Lithuanian Sea Museum. Ten families raising children with disabilities (age from 4 to 11 years) participated in this research: one family raising a child with a complex disability (main diagnosis – cerebral palsy), two families raising a child with cerebral palsy, two families raising children with Down syndrome, five families raising children suffering from the autism spectrum disorder took part in the dolphin–human wellbeing research (see Table 1).

Table 1 ***Research participants***

Respondent No.	**Gender**	**Diagnose**	**Age**
001	Girl	Complex disability, cerebral palsy, tetraparesis	7 years
002	Boy	Autism spectrum disorder	10 years
003	Girl	Cerebral palsy, paresis	8 years
004	Girl	Cerebral palsy, paresis	9 years
005	Boy	Down syndrome	12 years
006	Girl	Autism spectrum disorder	4 years
007	Boy	Autism spectrum disorder	8 years
008	Girl	Down syndrome	11 years
009	Boy	Autism spectrum disorder	7 years
010	Boy	Autism spectrum disorder	5 years

The families have been selected randomly from a general list of participants because of the geographical and diagnostic criteria: Down syndrome, autism spectrum disorder, and cerebral palsy. Families were informed that they could end their participation in the research at any time. They all took part in the holistic dolphin-assisted therapy lasting for two weeks. Each child participated in 10 therapeutic sessions with dolphins, and additional methods addressing individual needs, such as: Sherborne movement therapy, TEACCH structured learning, arts educational session, physiotherapy, music educational session, sensory integration, and individual consultations, were applied.

Methods of data collection:

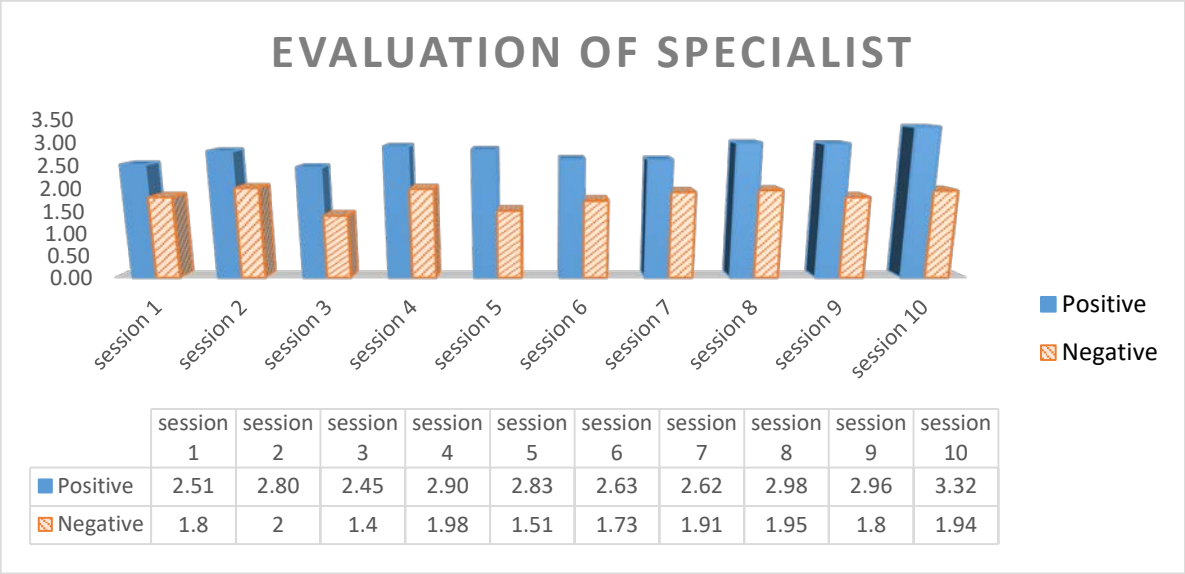
- *Chandler's Psychosocial Session Form* (PSF) *(2005)* was filled in by: working therapy specialist (physiotherapist/ psychologist/ social worker) after each dolphin-assisted therapy session and by parents. In total, 168 observatory protocols were analyzed.

  The PSF is used to effectively measure the change occurring as a result of DAT and to determine human behaviors of two types: positive social behaviors and negative social behaviors. The PSF provides three scores: positive social behavior score, negative social behavior score, and a total (overall) behavior score. The test is designed to be completed for a client by a therapist or therapy team at the end of each therapy session. It is a method for tracking client's social behavior change across treatment sessions. The intensity of a behavior present during sessions was rated on a Likert-type scale: 0 (none), 1 (very low), 2 (low), 3 (medium), 4 (high), and 5 (very high) (Chandler, 2012, 203). A permission to use this form for dolphin-assisted therapy research was given by the author (professor Cynthia Chandler). Statistical analysis employing the IBM SPSS Statistics 24.0 program and systemization with graphic visualization and descriptive analysis was applied.
- *Qualitative semi-structured interview* with parents, open coding was applied with narrative analysis. We conducted interviews a day before, two weeks and one month after therapeutic activities with dolphins. Each family was asked to mention expectations for the DAT program and about noticed changes in psychoemotional/ psychosocial, motor, and sensory spheres after DAT.

Results

The analysis of the Chandler's Psychosocial Session Form did not reveal a statistically significant difference between parents' and specialists' evaluation. It should be noted that parents evaluated changes in children more positively than the specialist working in this field. Fig 1 displays the average values of evaluation

scores for participating children's both positive and negative social behavior: a statistically significant positive change occurred in all psychosocial and behavioral patterns ($p<0.05$) despite the diagnosis. Statistically reliable ($p<0.05$) positive changes were measured in children's psychosocial sphere by all evaluators of the therapeutic program. The most significant positive change was measured in children with autism spectrum disorder, a slightly lower was recorded in children with cerebral palsy. No statistically significant changes were found in the case of children with Down syndrome. It is observed that on the average children's negative social behavior decreased after the third session with dolphins and on; and positive social behavior increased (see Fig. 1). This is to be related to children's higher self-control of emotions, better verbal and non-verbal expression, growing self-confidence, satisfied sensory needs, better motor planning, saturation of the limbic system. Involvement of animals into therapeutic procedures is based on the theory of interaction human–animal, holding it that such interaction can increase individual's physical and psychological wellbeing (O'Haire, 2013).



	session 1	session 2	session 3	session 4	session 5	session 6	session 7	session 8	session 9	session 10
Positive	2.51	2.80	2.45	2.90	2.83	2.63	2.62	2.98	2.96	3.32
Negative	1.8	2	1.4	1.98	1.51	1.73	1.91	1.95	1.8	1.94

Figure 1 ***Average positive and negative social behavior***

Results of the qualitative research were systematized, pointing out two major categories: *expectations before DAT*, *changes after DAT*. The narrative analysis revealed that all parents when talking about their expectations set for the dolphin-assisted therapy emphasized psychoemotional, psychosocial, sensory, and motor symptoms related to the primary diagnosis: "*I would like to see how a head is being held better*" (001), "*I would like to hear speaking, or at least a word uttered… sometimes it seems that something will be uttered straightaway, something is being mumbled in the mouth*" (006), "*he walks totally without coordination, stumbling over various things; it seems that even it is difficult for*

him to sit at a table" (009); "*a poor social contact, and the eye contact is minimal" (002), "I notice that child has a depressive mood, to say, vague emotions are observed, no eye contact is kept" (006), "emotions are completely unstable, no empathy at all" (007).* When talking to the parents after the therapy with dolphins, it was interesting to note that two weeks later they mentioned less changes caused by the dolphin-assisted therapy program comparing to the evaluation one month later. These results were especially emphasized in the group of parents raising children with autism disorder. According to them, the following most obvious changes could be pointed out: "*better recognize emotions of other people, are better able to control own negative emotions, less sensitive to touching" (007), "stays concentrated on occupational activities for a longer time, retain the eye contact for a longer time, several meaningful words were uttered" (002), "sleep and emotions became calmer, started talking more fluently, communicates with everyone more willingly" (009), "became calmer, retains attention for a longer time, more willingly performs tasks, less resistance against new tasks" (010).*

Differently from the evaluation of social behavior, where no statistically significant difference was found, parents of children with Down syndrome mostly emphasized an altered psychosocial sphere of children: "*self-confidence strongly increased*" (005), "*gained new friends*", "*is no longer afraid of unfamiliar people or children, for instance, starts a conversation, takes someone's hand, which is very important at school*" (008), "*the biggest changes are noticed at home: helps in doing everything, willingly bakes, cooks food with me, tidies up around, became much more self-sufficient*" (005).

Analysis of the differences among children points out that the biggest and statistically most significant change in social behavior was measured in the autism group. Positive social behavior of all children with a diagnosis of autism increased; whereas negative features of behavior decreased (see Tables 2, 3). A relative correlation is observed: the younger a child is, the more obvious the change is.

Table 2 ***Positive social behavior scores of children with autism (N=5)***

Evaluator: Specialist	TEB1S	TEB2S	TEB3S	TEB4S	TEB5S	TEB6S	TEB7S	TEB8S	TEB9S	TEB10S
Mean	2.62	2.99	2.95	2.86	2.93	2.79	2.87	3.07	3.03	3.39
Std. Error of Mean	0.42	0.37	0.26	0.27	0.32	0.46	0.18	0.16	0.28	0.20
Std. D.	0.94	0.82	0.59	0.60	0.72	1.04	0.39	0.37	0.63	0.45
Kurtosis	3.81	1.02	1.88	-3.09	-0.02	1.40	3.26	0.69	-2.22	3.61
Range	1.00	1.88	2.26	2.12	1.88	1.28	2.20	2.52	1.46	2.98
Minimum	3.40	4.13	3.88	3.32	3.73	4.16	3.16	3.48	2.33	4.15
Maximum	2.62	0.82	0.59	0.60	0.72	1.04	0.39	0.37	3.79	0.45

Table 3 ***Negative social behavior scores of children with autism (N=5)***

Evaluator: Specialist	NEB1S	NEB2S	NEB3S	NEB4S	NEB5S	NEB6S	NEB7S	NEB8S	NEB9S	NEB10S
Mean	2.34	2.06	2.10	2.37	1.72	1.83	1.64	1.65	1.85	1.70
Std. Error of Mean	0.05	0.13	0.07	0.08	0.15	0.28	0.46	0.27	0.33	0.13
Std. Deviation	0.11	0.29	0.16	0.17	0.34	0.62	1.03	0.61	0.73	0.30
Kurtosis	-2.74	- 2.36	- 0.91	-2.05	0.91	- 0.66	-0.25	-0.10	0.39	0.85
Range	0.24	0.67	0.41	0.41	0.94	1.59	2.53	1.49	1.89	0.74
Minimum	2.23	1.71	1.88	2.18	1.25	1.00	0.12	0.75	1.05	1.24
Maximum	2.47	2.38	2.29	2.59	2.19	2.59	2.65	2.24	2.94	1.98

Scores of positive and negative social behavior of one surveyed child with a complex disability strongly stood out among results of other surveyed children (see Fig. 2).

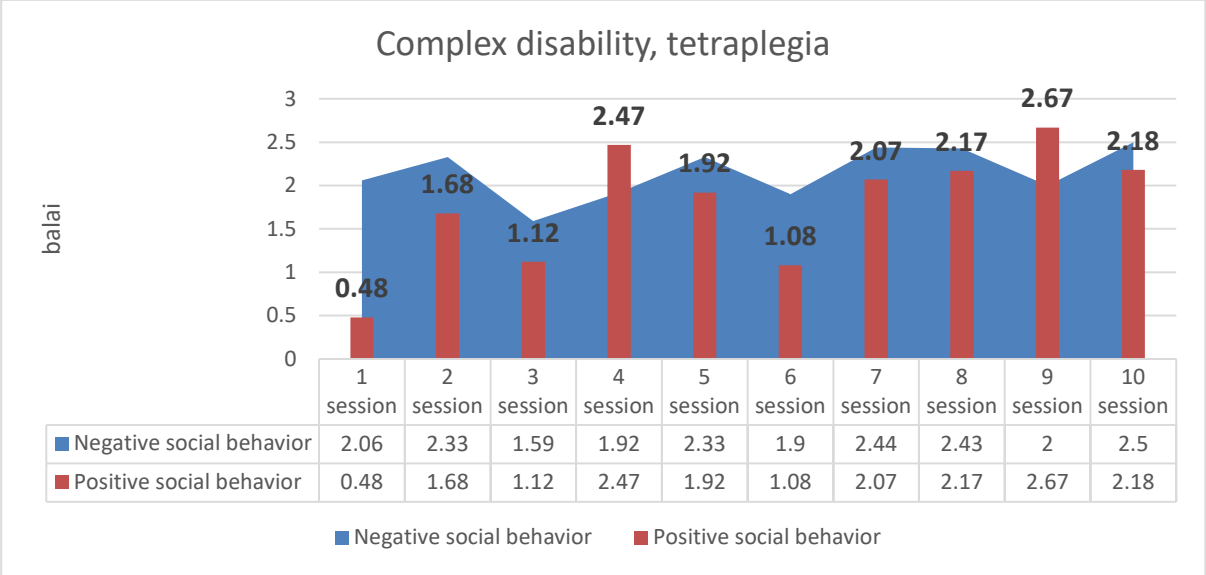


Figure 2 ***Positive and negative social behavior of a participant with a complex disability***

Figure 2 demonstrates that negative social behavior increased, like positive one did, too. Whereas the narrative analysis revealed that parents both two weeks and one month later mentioned a very high benefit of the dolphin-assisted therapy program: "*now he obviously holds his head more stably, sialorrhea is no longer as intense as it was earlier, epilepsy attacks decreased twice and the child himself changed the most, became as if more adult: started expressing his own opinion, it became obvious he wanted to participate in a conversation with other family members, smiled more often*" (001). Interesting to note that, on the contrary, the negative social behavior recorded in the Chandler Psychosocial Session Form

manifested positively in the case of this child, i.e. observed contradiction or opposition to the specialist was evaluated by parents (or specialist) as child's "awakening" from constant condition of passiveness; therefore, one month later, parents mentioned that epilepsy attacks which would be evoked by any sensory stimulus (light, touch, barking of a dog, laughter etc.) decreased due to increased tolerance and child's activity level, i.e. the child more consciously observed environment, communicated, smiled.

Discussion

All families who participated in this research evaluated dolphin-assisted therapy program as "very effective" two weeks and one month after DAT. All families raising children with autism spectrum disorder mentioned lower occurrence of sensory-related issues, such as: better motor coordination and planning, lessening emotional crisis and tantrums, openness in social interaction etc. Families raising children with cerebral palsy and complex disability reported noticeable change in motor sphere: better head-holding position, less involuntary saliva occurrence, longer engagement time for tasks, etc.

Our research results coincide with the findings of research works conducted by other scientists, where a positive effect of the dolphin-assisted therapy on children with disabilities is found (Breitenbach et al., 2009; Dilts et al., 2011; Griffioen & Enders-Slegers, 2014; Md Yusof & Chia, 2012; Stumpf & Breitenbach, 2014). The authors emphasize that after application of the dolphin-assisted therapy speech, communicative behavior, motor functions of children with disabilities improve. In the course of the dolphin-assisted therapy or after it a child with a disability becomes braver, more relaxed and self-confident, able to better concentrate and retain attention, also verbal expression, ability to keep an eye contact improve, a child is more keen on communicating with other children, more involving in performance and life of own family in general (Breitenbach et al., 2009; Stumpf & Breitenbach, 2014). The families that took part in the research mentioned that their interaction inside family changed the most. Other scientific research studies, such as Kreivinienė, Vaičekauskaitė (2010) and Breitenbach et al. (2009), also supplement the findings of this investigation. For example, Breitenbach et al. (2009), having investigated changes in children with a complex disability after DAT, obtained that no statistically significant changes were found; nevertheless, the most significant changes took place in family coherence and parents–children relationships, i.e. parents stated that they understood their child, one's glance, sound etc. better.

When talking about the changes in the autism spectrum group, it is important to note that the problem psychosocial behavior usually holds the symptoms of sensory disorders. Therefore, when applying the dolphin-assisted therapy

accompanied with sensory integration, the most visible change is reported. In the cases of all children of the autism group, an interesting deviation is reported during the sixth session, i.e. the increase of negative social behavior and the decrease of positive behavior are observed. This is not statistically significant; however, it is an important practical instance because children underwent the dolphin-assisted therapy for 2 weeks including a two-day break, i.e. the research results demonstrated that during the session that was held after the break positive features of social behavior were expressed poorer in comparison to the fifth session. Later, the features progressively increased.

To sum up the obtained results, after the dolphin-assisted sessions those children's functions which could have been impacted by good psychoemotional environment, elements of physical therapy in water, tactile contact with a dolphin improved: sensomotor condition, sleep, social behavior, self-sufficiency improved the most; sensitivity to tactile stimuli decreased. These are the features which are highly important for child's socialization. Optimal psychoemotional environment is created for a child not only during the sessions but also after them.

A family taking part in the dolphin-assisted therapy applied to a child with disability improves their mutual interaction, and these changes are maintained and become the fundamental for further development of that child.

The respondents underlined that the changes after the sessions with dolphins usually manifested 1 week after the dolphin-assisted activities, and the changes linked to the dolphin-assisted therapy are noticed to the present day.

Conclusions and implications

1. Dolphin-assisted therapy is applied as a holistic approach where program is individualized according to the special needs of a participant. Previous as well as the present research prove that the most effective therapeutic results are achieved when DAT is applied together with complementary methods. Statistically positive changes have been found in psychoemotional and behavioral patterns in all surveyed children. All families filling in an open-ended feedback form mentioned that there could be much more complementary methods applied together with the dolphin-assisted therapy. Qualitative results brought to the light:
   a) motor (better head-holding position, less involuntary saliva occurrence) in cerebral and complex disability;
   b) psychoemotional/ psychosocial and sensory (increased social understanding and social interaction, less opposing behavior, speech understanding, she is much more calm and listening to instructions, etc.) in the autism case; and

c) psychosocial and cognitive (more active verbal speech, he got lots of sensations, betterment in social interaction, he said first verbal words, much more shows initiatives what to do, increased social activity, very much motivated to say sentences, started to sing melodies, playing much longer and more complex games) in Down syndrome related changes 2 weeks and 1 month after application of the dolphin-assisted therapy.

2. Mostly deferrable reactions were measured for children with cerebral palsy, complex disability, and especially autism. Parents observed a much greater positive psychosocial and behavioral change in comparison to the specialist. Especially a great change was measured in decreasing occurrence of negative symptoms during the last dolphin-assisted therapy sessions. Neither specialist's nor parental evaluation revealed any statistically important changes in psychosocial session form for children with Down syndrome; however, an open-ended questionnaire revealed their change in the social life and cognitive development.
3. Families perceive the dolphin-assisted therapy as a program "recharging" and relaxation for all family members. They mention positive changes occurred not only in children with disabilities but also in all family members and increased inner sense of coherence.

Acknowledgements

Authors express gratitude to all families who willingly participated in this research for supportive collaboration in conducting this research.

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