DOLPHIN ASSISTED THERAPY: WELFARE OF BOTH PATIENTS WITH DEPRESSION AND PARTICIPATING DOLPHINS

Brigita Kreivinienė

Laura Lupeikaitė

Aelita Bredelytė

Žilvinas Kleiva

Lithuanian Sea Museum Center of Dolphin Assisted Therapy and Klaipėda University, Lithuania

Abstract. *The main aim of this research was to measure the effect of dolphin assisted therapy on both patients and participating dolphins. The research measured welfare of patients with depression and situational welfare of dolphins which participated in the dolphin assisted therapy programme. Patients with organic depression took part in two-week dolphin assisted therapy sessions. When measuring situational welfare of dolphins, the study sample consisted of nine individual dolphins (Tursiops truncatus ponticus, Lat.): three males and six females ranging from five to twenty years. The main research results revealed that psychosocial characteristics of patients with organic depression disorder as well as patients' self-evaluation changed statistically significantly, the symptoms of depression decreased. The research revealed that patients were much more physically active during the period of participation in the dolphin assisted therapy process than before. The analysis of dolphin behaviour brought to the light that most of the therapy time dolphins behaved positively. There were noticed no therapy sessions where the dolphin behaviour would be evaluated as more negative than positive or just negative.*

Keywords: dolphin assisted therapy, depression, welfare.

Introduction

Depression is reported as the largest health concern in the 21st century (World Health Organisation [WHO], 2013). The somatic symptoms of mental disorders are various sensations or one's body pain imitating pathology of particular organs or organ systems and quite often causing disability (Grover, Sahoo, Chakrabarti, & Avasthi, 2019; Savicius, 2021). Such patients usually complain about appetite and weight loss, overall weakness, sleep disorders, various kinds of pain (Miller & Campo, 2021). Organic depression can occur in the presence of an unrelated medical disorder or mimic a recognised disorder, represent a true symptom of an underlying medical disorder. However, diagnosis of organic depression is complicated by the fact that patients have a high incidence

of somatic symptoms, such as weakness, headache, dizziness, distress and abdominal discomfort (Dietch & Zetin, 1983; American Psychiatric Association [APA], 2019). Patients use to search for alternative pathways to help themselves instead or in addition to drug treatment. People suffering from depression usually search for additional or complementary methods to help, as other studies show that treatment provided by complementary and alternative medicine (CAM) might be a substitute for conventional care, particularly in patients with moderate disease (Hansen & Kristoffersen, 2016). The holistic dolphin assisted therapy (DAT) tends to be one of such methods. However, during the last decade, welfare of animals being kept under care of people is given much attention; so the dolphin welfare science is rapidly developing (Delfour, Vaicekauskaite, & García-Párraga, 2021; Delfour et al., 2020; Brando, Broom, Acasuso-Rivero, & Clark, 2017) and, therefore, it is relevant to investigate not only the therapeutic effect on people suffering from depression, but also on participating animals. Some research works evaluate DAT negatively in terms of dolphin welfare. Such research is often conducted on the overview basis aiming to reject and criticise any research on dolphin therapy. The criticism is based on the view that a contact with a human disturbs natural behaviour of dolphins, causes stress, a human can infect a dolphin with various diseases (Mcdonald, Pace, Blue, & Schwartz, 2012; Brakes & Williamson, 2007; Williamson, 2008; Marino & Lilienfeld, 2007; Marino & Lilienfeld, 1998); however, there exist a lack of studies which would prove these aspects. Therefore, multidisciplinary research is necessary to answer this criticism. For this reason, parameters of both people and dolphins participating in the therapy were measured when investigating welfare.

The so-called "welfare pyramid" which attempts to condense the most important biological components of animal welfare was chosen as the basis for the dolphin welfare research. The basic animal welfare aspects are: physiological needs, veterinary care and safety. The top segments deal with advanced needs, or "wants", i.e. a possibility for an animal to choose. However, reaching the higher animal welfare needs can be challenging. On the one hand, it may have no obvious financial or other benefits, but, on the other hand, animal chooses for itself when its other and more fundamental requirements have been met (Mellor, Hunt & Gusset, 2015). Therefore, animals' choice research is very important in the science of animal welfare.

To make a choice, animals need to prioritise their behaviour and decide which actions to perform. Animals' decisions depend on internal and external stimuli, the emotions that they elicit, motivation, behavioural goals, valuation, decision-making and its modulation by mood, the assessment of behavioural outcomes, memories (Gygax, 2017; Crystal, 2016; Mendl & Paul, 2004). It is important to note that initiating and interacting with the person which was chosen by the animal can be reinforced without a need for a food reward (Brando et al., 2018). For these reasons, it is necessary to study not only the benefits of DAT,

but also the impact of DAT separately from dolphin's welfare and choice, including both the observed changes in children and the situational well-being of dolphins involved in therapy.

Therefore, the research aim was to investigate the effect of dolphin assisted therapy on both patients with organic depression and participating dolphins. To investigate the influence of dolphin assisted therapy on physical and psychosocial rehabilitation, several scales were used: HAD scale, SF-36, Chandler's Psychosocial Session Form. For the assessment of the situational welfare, the dolphin behaviour was analysed as the indicator. To determine the behavioural changes over time, according to the time interval, the therapy session was divided into three parts (Part 1: 0 to 10 minutes; Part 2: 10 to 20 minutes; Part 3: 20 to 30 minutes); at each interval, the animal's behaviour was re-evaluated.

Materials and Methods

14 patients diagnosed with organic depression classified as an organic and symptomatic mental disorder (F00-F09 according to TLK-10-AM systematic list of diseases), including 12 women and 2 men (Table 1), took part in the empirical research. The average age of the surveyed was 43 (MIN=22 MAX=61). The aim of this research was to analyse the changes in welfare of adult patients with depression when measuring before and after the dolphin assisted therapy. For a period of 10 days, the patients participated in 30-minute DAT every day and one additional 30-minute movement exercise programme. After 5 days, a 2-day break was made.

*Table 1 **Demographic characteristics of research participants***

Gender	Age (years)	Age when depression diagnosis was set
Woman	45	18
Woman	47	40
Woman	31	20
Man	40	34
Woman	26	12
Man	22	15
Woman	48	25
Woman	51	51
Woman	58	40
Woman	33	22
Woman	61	40
Woman	43	36
Woman	42	29
Woman	55	46

Source: Demographic characteristics of research participants. n=14

To investigate the welfare of the patients participating in the DAT physical and psychosocial rehabilitation, several scales were used. The hospital anxiety and depression scale (HADS) (Zigmond & Snaith, 1983) was used to detect states of depression (HAD-D) and anxiety (HAD-A) of the research participants before and after the course of the dolphin assisted therapy. Cronbach's alpha for HADS-A was 0.86 and for HADS-D was 0.82. To score the HADS, the scales were standardised with a scoring algorithm to obtain a score ranging from 0 to 21. Lower scores indicate better health status: 0–7 = Normal, 8–10 = Borderline abnormal (borderline case), and 11–21 = Abnormal (case). The SF-36 questionnaire was used to reveal health concepts before and after the course of the dolphin assisted therapy from the patient's perspective. The SF-36 is a multipurpose, short-form health survey with only 36 questions. It yields an eight-scale profile of scores, including behavioural function and dysfunction, distress and well-being, objective reports and subjective ratings and both favourable and unfavourable self-evaluations of general health status as well as physical and mental health summary measures (Ware, 2000). To score the SF-36, the scales were standardised with a scoring algorithm to obtain a score ranging from 0 to 100. Higher scores indicate better health status, and a mean score of 50 has been articulated as a normative value for all scales. Chandler's Psychosocial Session Form (PSF) (2005) was used to effectively measure the change occurring as a result of DAT and to determine human behaviours of two types: positive social behaviours and negative social behaviours. The test is designed to be completed at the end of the therapy session. In this research, the form was filled in after the first, third and sixth therapy sessions. It is a method for tracking client's social behaviour change across treatment sessions. The intensity of one's behaviour 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, 2011). Mean, std. deviation, significance level (p-value of 0.05 or lower was considered statistically significant), and Cohen's d effect size was calculated to reveal the difference of physical and mental state before and after the therapy.

Measuring situational welfare of dolphins, the study sample consisted of 9 individual dolphins (*Tursiops truncatus ponticus*): 3 males and 6 females, their age ranging from 5 to > 20 years. When conducting the research, the following conditions were observed: 1. The dolphin participates in therapy sessions no more than 2 times a day; 2. The dolphin participates in no more than 10 therapy sessions with one client; 3. After 10 consecutive sessions, the dolphin does not participate in therapy sessions for 14 days; 4. When a dolphin participates in dolphin assisted therapy, it does not participate in other activities. For the assessment of the situational welfare, the dolphin behaviour was analysed as the indicator. To determine the behavioural changes over time, according to the time interval, the therapy session is divided into three parts (Part 1: 0 to 10 minutes; Part 2: 10 to 20 minutes; Part 3: 20 to 30 minutes); in each interval, the animal's behaviour was

re-evaluated. In the analysis of the footage, the frequency of the behavioural units was first estimated. The results of the analysis are marked in a questionnaire in which the behavioural patterns are classified into positive and negative. The frequency of behaviour was rated on a scale of 1 to 4, where 1 – never; 2 – rarely; 3 – often; 4 – always, 0 – the action, task not requested. The values of the evaluation scale of negative behaviour patterns were 1 or 4, where 1 – negative behaviour occurred; 4 – no negative behaviour (Table 2). A behaviour unit was created for description of each behaviour pattern.

Table 2 ***Description of patterns of dolphins in therapeutic process***

Behaviour pattern	Description of the behaviour pattern	Behaviour unit
Approach to the client	Targeted movement towards the client. Dolphin's body is in horizontal position (dorsal fin up).	Slow, calm
		Swims up immediately, does not avoid contact
		Returning to the therapeutic pool after active commands, maintains a safe distance from therapy participants
Floating position	Local suspending on the water surface. Dolphin's body in a horizontal position (dorsal or pectoral fins upwards).	The dolphin is calm
		Does not avoid a contact
Floating of a client	The movement of a dolphin and a client on the surface of the water when the client is holding onto the dolphin's back or chest fins. The dolphin's body is in a horizontal position (dorsal or pectoral fins upwards).	Willingly floats a client
		Does not avoid a contact
Reaction to a given task	Dolphin's reaction to a gesture / command shown by therapy participants.	Performs passive tasks willingly
		Performs active tasks willingly
Contact with environ-mental enrichme nt	Any relation (body, fins, rostrum, mouth) with the means of enriching the environment (by touching, mouthing up).	Actively reacts to a thrown ball
		Actively reacts to the thrown ring
		Does not avoid contact with other environmental enrichment means
Demonst-ration of aggressiv e mood	Signs of dolphin's aggressive mood	The flow of air bubbles under water
		Strong jawbone clap
		Slapping the tail to the surface of the water
		Sudden nodding of the head
		Sudden mouth opening
Aggressiv e behaviour	A destructive form of dolphin's behaviour directed against another animal or human.	The approach is accompanied by a bite
		Hitting another animal with a tail
		Hitting therapy participants with a tail
The freedom of choice	The choice of a dolphin to participate in a therapy session or engage in another activity.	Does not leave the therapy pool for the entire scheduled time of the session, engages in session activities

Source: Description of patterns of dolphins in therapeutic process. n=21 units, 33 sessions

After assessing each behaviour unit, averages were derived at the behavioural model and time plane levels. Each mean was equated to a general behavioural evaluation scale. This principle describes the general behaviour of the animal both in the individual parts of the therapy session and throughout the session. The values of the general behaviour evaluation scale varied from 1 to 4, where 1 – negative behaviour; 2 – more negative than positive behaviour; 3 – more positive than negative behaviour; 4 – positive behaviour. If the overall behaviour of the animal was assessed as "positive", the units of positive behaviour occurred more often than negative during the study (mean value of the indicator > 3.5); if the overall behaviour was described as "negative", the units of negative behaviour were more frequent than positive (mean value of the indicator < 1.5)

The behaviour of dolphins was recorded using video cameras only during the sessions. In order to determine whether the behaviour of the dolphin in the therapy session changes tendentiously, the data of the first, fourth, seventh and tenth therapy sessions with the same client were used for the analysis. It includes 33 sessions, 16 hours and 30 minutes of visual material. The data was processed using the Statgraphics Centurion 18-X64 statistical program applying Shapiro-Wilk criteria, quantile comparison diagram and Kruskal–Wallis test.
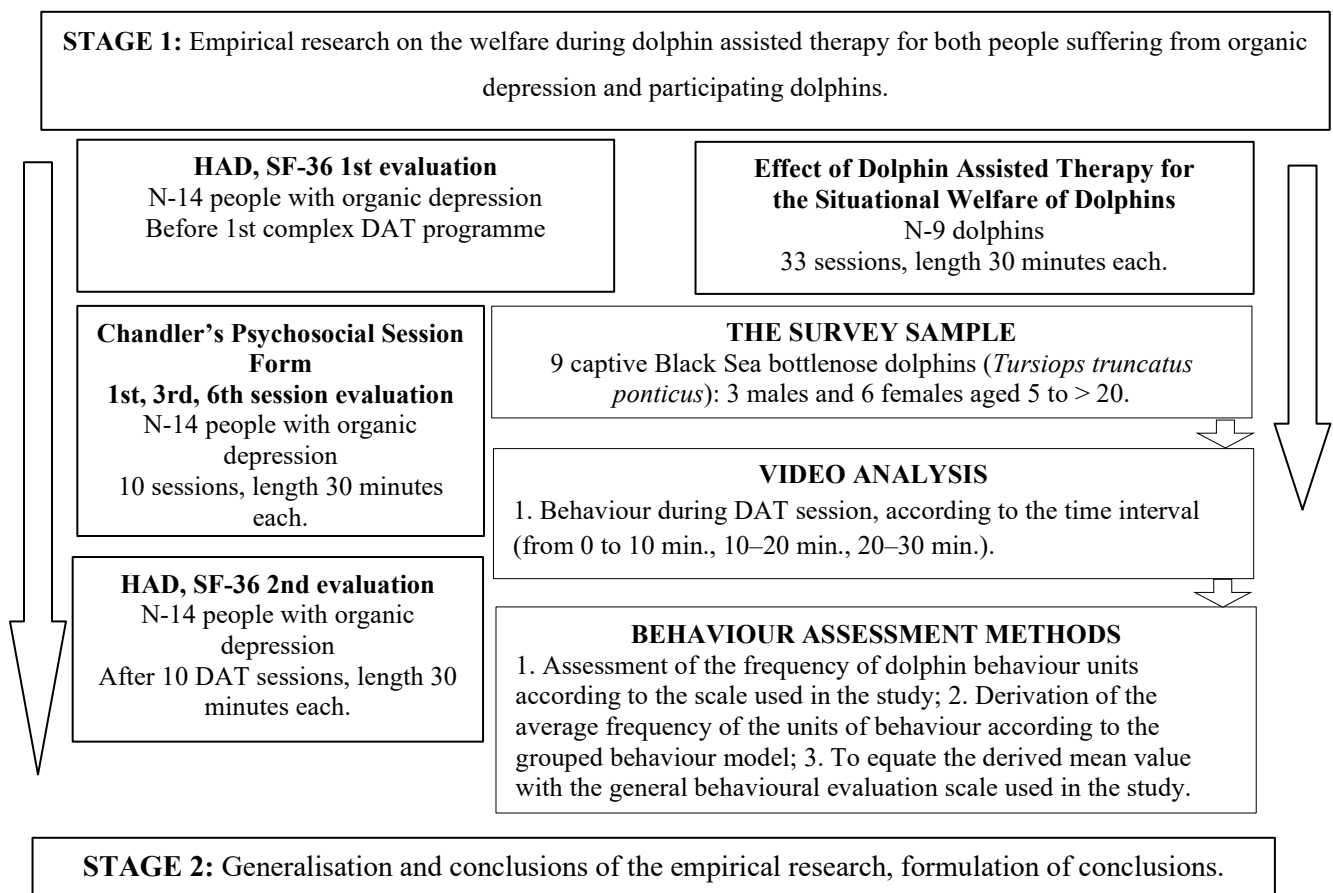The research design is depicted in Figure 1.

STAGE 1: Empirical research on the welfare during dolphin assisted therapy for both people suffering from organic depression and participating dolphins.

HAD, SF-36 1st evaluation
N-14 people with organic depression
Before 1st complex DAT programme

Effect of Dolphin Assisted Therapy for the Situational Welfare of Dolphins
N-9 dolphins
33 sessions, length 30 minutes each.

Chandler's Psychosocial Session Form
1st, 3rd, 6th session evaluation
N-14 people with organic depression
10 sessions, length 30 minutes each.

THE SURVEY SAMPLE
9 captive Black Sea bottlenose dolphins (*Tursiops truncatus ponticus*): 3 males and 6 females aged 5 to > 20.

VIDEO ANALYSIS
1. Behaviour during DAT session, according to the time interval (from 0 to 10 min., 10–20 min., 20–30 min.).

HAD, SF-36 2nd evaluation
N-14 people with organic depression
After 10 DAT sessions, length 30 minutes each.

BEHAVIOUR ASSESSMENT METHODS
1. Assessment of the frequency of dolphin behaviour units according to the scale used in the study; 2. Derivation of the average frequency of the units of behaviour according to the grouped behaviour model; 3. To equate the derived mean value with the general behavioural evaluation scale used in the study.

STAGE 2: Generalisation and conclusions of the empirical research, formulation of conclusions.

*Figure 1 **Research design***

Research Results: Subjective Welfare of Dolphins Participating in the DAT Process

Grounding on the behaviour evaluation scale applied in the research, dolphins' behaviour was described as positive in thirty-one dolphin assisted therapy sessions, as more positive than negative in two DAT sessions. There were no sessions with dolphins' behaviour evaluated as more negative than positive or fully negative. Overall, dolphins' behaviour was analysed and evaluated in thirty-three DAT sessions (Figure 2).

In the study, an important task related to dolphins' welfare was to determine whether the dolphin behaviour tends to change over time during one therapy session. Therefore, the therapy session was divided into three parts according to the time interval and the dolphin's behaviour was re-evaluated in each part of the session.
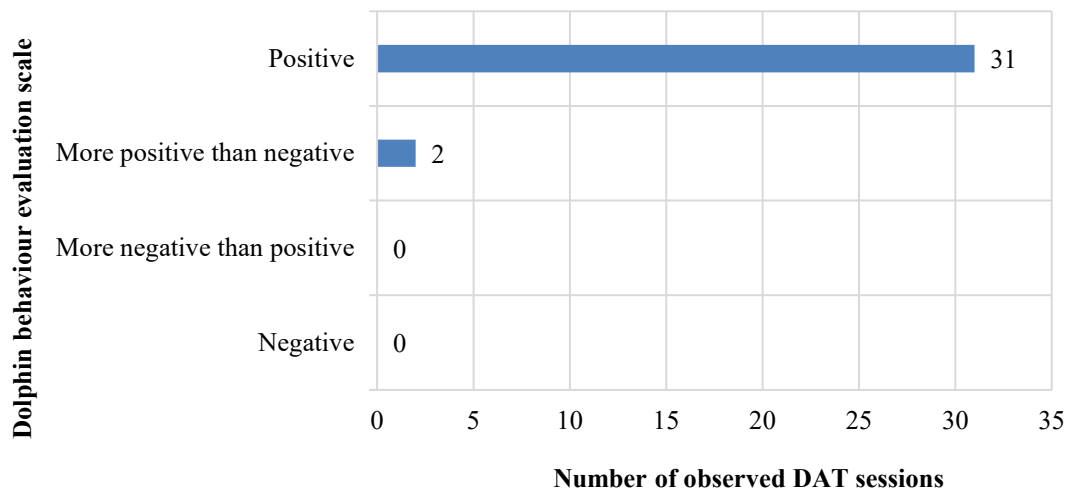

*Figure 2 **Dolphin behaviour evaluation scale during the research***

When carrying out statistical analysis of the data on behaviour, the normality probability plot was tested by Shapiro–Wilk criterion and quantile comparison diagram. As the normality probability plot was not satisfied, a median of samples, but not a mean, was analysed. After the analysis of the footage, according to the dolphin behaviour evaluation scale used in the study, the median values of the indicators changed as follows: Part 1: 3.833 ($n = 33$), Part 2: 3.857 ($n = 33$), Part 3: 3.857 ($n = 33$), using the scale where 1 is negative behaviour; 2 – more negative than positive behaviour; 3 – more positive than negative behaviour; 4 – positive behaviour. The defined behaviour values describe the behaviour of dolphins during the therapy session as positive. After processing the data by statistical methods (Kruskal–Wallis test), it was found that there was no statistically significant difference between the medians of these values ($p > 0.05$) (Table 3).

Table 3 **The median of assessed behavioural values during different parts of therapy session**

Part of a therapy session	N	Median of assessed behavioural values	Kruskal–Wallis test to compare medians	
			Kruskal–Wallis test	p
1st part (0–10 min.)	33	3.833	1.688	0,429
2nd part (10–20 min.)	33	3.857		
3rd part (20–30 min.)	33	3.857		

Source: The median of assessed behavioural values during different parts of therapy session. n=33

Such results (Figure 2, Table 3) suggest that under the conditions when dolphins participate in therapy sessions, their behaviour changes slightly over time and remains positive.

Behaviour is a reflection of mental and physical state, and the better the behaviour of a given species is studied, the easier it is to make judgements about the needs and health of the animal (Reisner & Shofer, 2008). Unfortunately, no similar studies investigating dolphin behaviour in DAT sessions have been found in the literature, therefore the results can not be compared with those of other researchers. However, Trone & Kuczaj (2005) investigated the behaviour of dolphins participating in dolphin-human recreational swimming programmes. The researchers also assessed the frequency of certain dolphin behaviour and found that the interactions were not harmful to the participating dolphins.

Research Results: Welfare of Patients Suffering from Organic Depression

The research results of measuring patients' anxiety and depression before the DAT sessions and after them revealed that the therapy sessions were effective, and decrease of the said symptoms was measured. The results reveal the decreased level of anxiety, especially decreased feeling of tense and wound up (Cohen's d=1.08; p=0.004), worrying thoughts (Cohen's d=1.27; p=0.001) and feelings of panic (Cohen's d=0.41; p=0.048) (Figure 1). The total score for the anxiety scale before the dolphin assisted therapy was 8.86, meaning "Borderline abnormal"; and after the therapy it was 6.21, meaning "Normal".
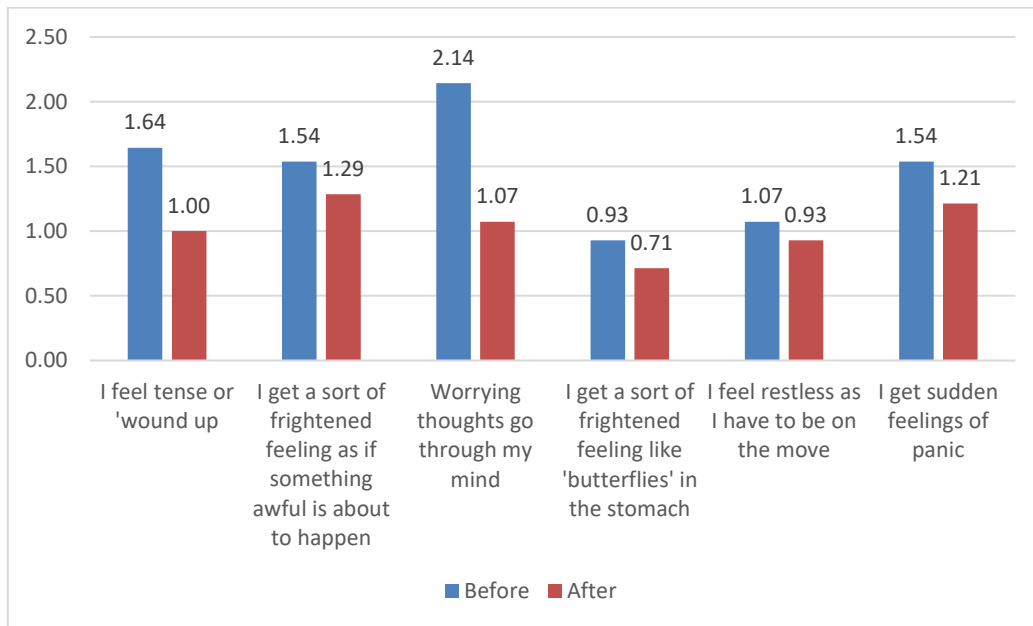
*Figure 3 **Anxiety (HAD-A) before and after the dolphin assisted therapy session***
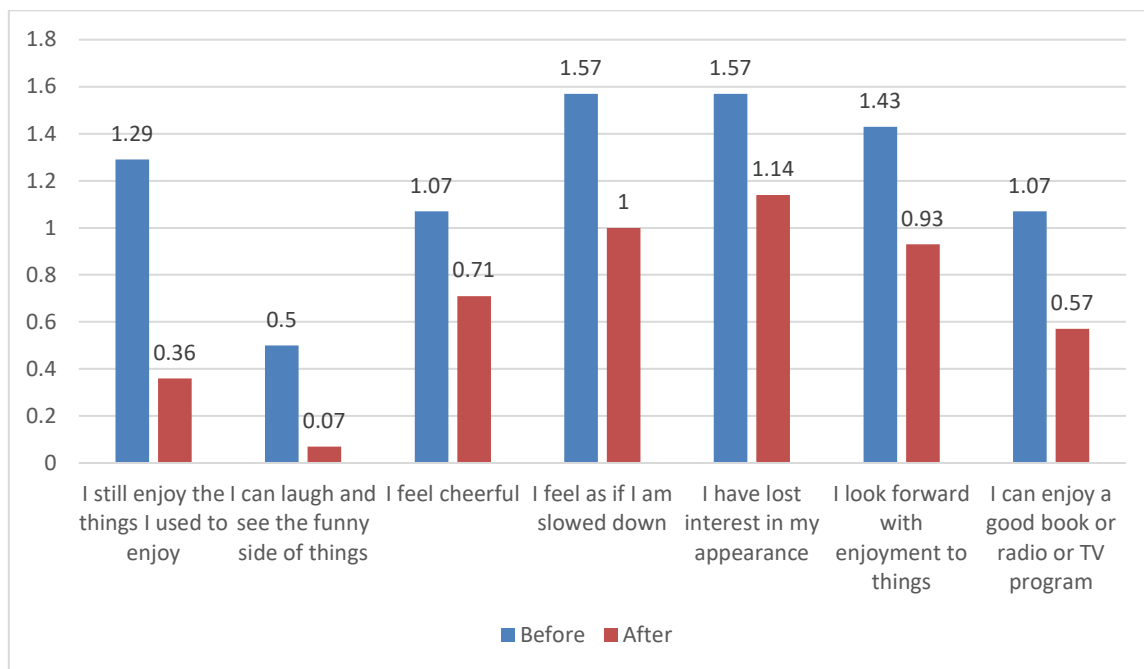

*Figure 4 **Depression (HAD-D) before and after the dolphin assisted therapy session***

Depression decreased in all cases, especially enjoyment of things (Cohen's d= 1.06; p=0.005), possibility to laugh and see a funny side of things (Cohen's d=0.86; p=0.016) and enjoying a book, radio or TV programme (Cohen's d=0.73; p=0.033) (Figure 2). The total score for the anxiety scale before the DAT was 8.5, meaning "Borderline abnormal"; and after the therapy it was 4.78, meaning "Normal". There is a lack of scientific research in dolphin assisted therapy impact for people with depression. However, the research results could be supported by

early study of Birch (1998) revealed that in general sonar emitted by dolphin echolocation system acts as catalyst to endorphin releaser, therefore, after swim-with-dolphin programs adults were feeling very excited and enjoyed.

The assessment of the patients' life quality using SF-36 scale before and after the DAT demonstrates that such parameters as lifting or carrying groceries, climbing one flight of stairs, bending, kneeling or stooping, walking several blocks, one block, having a bath or dressing yourself, accomplished less than you would like, were limited in the kind of work or other activities, had difficulty performing the work or other activities (for example, it took extra effort), I seem to get sick a little easier than other people, I am as healthy as anybody I know and I expect my health to get worse, remained the same and DAT did not have any effect on them. Such important parameters as general health, physical activity, emotional issues and pain, changed statistically significantly (Tables 4, 5 and 6).

*Table 4 **The measuring results of SF-36 before and after DAT***

	Before DT/After DT	N	Mean	Std. deviation	Sig.	Effect size Cohen's d
In general, would you say your health is	Before DT	14	30.36	22.315	**0.002**	22.582
	After DT	14	57.14	22.847		
Compared to one year ago, how would you rate your health in general now?	Before DT	14	48.21	20.719	**0.002**	22.430
	After DT	14	75.00	24.019		
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	Before DT	14	14.29	23.440	**0.009**	26.338
	After DT	14	39.29	28.947		
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	Before DT	14	35.71	30.562	**0.003**	31.449
	After DT	14	71.43	32.310		
Climbing one flight of stairs	Before DT	14	53.57	41.437	**0.025**	36.877
	After DT	14	82.14	31.666		
Walking more than a mile	Before DT	14	57.14	43.222	**0.036**	35.258
	After DT	14	82.14	24.862		
Cut down the amount of time you spent on work or other activities	Before DT	14	78.57	42.582	**0.035**	30.110
	After DT	14	100.00	0.000		
Accomplished less than you would like	Before DT	14	14.29	36.314	**0.022**	44.783
	After DT	14	50.00	51.887		

Source: The measuring results of SF-36 before and after DAT. n=14

Similar research findings were mentioned in randomised controlled trial Antonioli & Reveley (2005) study where patients with depression took part. The research also revealed that depression symptoms significantly decreased in 2-week dolphin therapy program, including physical pain associative with depressive prevalence.

*Table 5 **The measuring results of SF-36 before and after DAT***

	Before DT/After DT	N	Mean	Std. deviation	Sig.	Effect size Cohen's d
Didn't do work or other activities as carefully as usual	Before DT	14	21.43	42.582	**0.028**	47.173
	After DT	14	57.14	51.355		
Emotional problems interfered with your normal social activities with family, friends, neighbours or groups?	Before DT	14	42.86	20.636	**0.000**	21.291
	After DT	14	75.00	21.926		
How much bodily pain have you had during the past 4 weeks?	Before DT	14	48.57	26.849	**0.007**	27.114
	After DT	14	75.71	27.376		
During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?	Before DT	14	58.93	27.045	**0.018**	25.744
	After DT	14	80.36	24.374		
Did you feel full of energy?	Before DT	14	38.57	27.695	**0.001**	24.939
	After DT	14	70.00	21.839		

Source: The measuring results of SF-36 before and after DAT. n=14

*Table 6 **The measuring results of SF-36 before and after DAT***

	Before DT/After DT	N	Mean	Std. Deviation	Sig.	Effect size Cohen's d
	After DT	14	64.29	22.434		
Have you felt so down in the dumps that nothing could cheer you up?	Before DT	14	38.57	21.432	**0.001**	25.527
	After DT	14	71.43	29.051		
Have you felt calm and peaceful?	Before DT	14	48.57	27.972	**0.001**	21.407
	After DT	14	75.71	11.579		
Did you have a lot of energy?	Before DT	14	34.29	19.890	**0.000**	16.274
	After DT	14	75.71	11.579		
Have you felt downhearted and blue?	Before DT	14	31.43	10.271	**0.000**	13.947
	After DT	14	72.86	16.838		
Did you feel worn out?	Before DT	14	30.00	20.381	**0.000**	22.434
	After DT	14	72.86	24.315		
Have you been a happy +A61:A74 person?	Before DT	14	25.71	21.381	**0.000**	17.790
	After DT	14	77.14	13.260		
Did you feel tired?	Before DT	14	27.14	24.315	**0.007**	23.110
	After DT	14	50.00	21.839		
During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?	Before DT	14	41.43	19.945	**0.000**	22.114
	After DT	14	74.29	24.088		
My health is excellent	Before DT	14	25.00	25.944	**0.003**	28.947
	After DT	14	57.14	31.666		

Source: The measuring results of SF-36 before and after DAT. n=14

The research results while measuring the behavioural change before and after DAT programme for people suffering from organic depression brought to the light that it was an increase of positive social behaviour after the 1st, 3rd and 6th DAT sessions, the positive behaviour improved after every DAT session (Table 7, 8). However, a significant increase was revealed in most cases when comparing results of the 1st and 6th DAT sessions. The negative social behaviour after DAT decreased; however, significant changes were revealed in three (defensive, cautious; bad or depressed; morose) out of 17 variables. Such variables as: quite obstinate, honest/ moral, maintains eye contact, is able to express in words, remained without change however, not all of these variables were significant in general for this group of participants. Two variables, working in team and self-confident, have changed very quickly, as revealed when measuring the 1st and 3rd sessions of DAT. Already mentioned randomised study of Antonioli & Revely (2005) also revealed that the therapy with dolphins was effective in alleviating similar symptoms of depression after two weeks of treatment while measuring with Hamilton rating scale and Beck depression inventory.

Table 7 **The measuring results of Chandler Psychosocial Session form: Positive social behaviour after the 1st, 3rd and 6th DAT sessions (main results)**

Number of DAT session		Mean	Std. deviation	Sig. 1 vs. 3	Sig. 1 vs. 6
T1. Participating, engaging in activities	1	3.43	0.85	0.061	**0.000**
	3	3.86	0.53		
	6	4.83	0.39		
T2. Positively interacting, communicating with others around	1	3.50	0.94	0.059	**0.000**
	3	4.00	0.68		
	6	4.83	0.39		
T3. Collaborating	1	3.57	0.94	0.089	**0.000**
	3	4.00	0.68		
	6	4.92	0.29		
T5. Focuses, careful with a task	1	3.50	1.09	0.190	**0.001**
	3	3.86	1.03		
	6	4.67	0.49		
T9. Leading	1	2.21	1.31	0.075	**0.001**
	3	2.86	0.95		
	6	3.83	0.94		
T10. Working in team	1	3.64	0.74	**0.036**	**0.000**
	3	4.14	0.66		
	6	4.75	0.62		

Source: The measuring results of Chandler Psychosocial Session form: Positive social behaviour after the 1st, 3rd and 6th DAT sessions (only main results are displayed). n=14

Because of the lack in scientific studies on dolphin assisted effect to adults with depression, the results of this study could be supported by Webb & Drummon (2001) study which also brought to the light that 2-week swim with dolphins' program in general lowered anxiety level and increased positive psychological effects, and well-being of healthy participants. However, the study showed that dolphins were the key factor only for anxiety features. Similar psychosocial parameters are measured as significantly changed in this presented research.

Table 8 **The measuring results of Chandler Psychosocial Session form: Positive social behaviour after the 1st, 3rd and 6th DAT sessions (main results).**

Number of DAT session		Mean	Std. deviation	Sig. 1 vs. 3	Sig. 1 vs. 6
T13. Flexible, open to novelties	1	2.93	1.27	0.032	**0.000**
	3	3.71	0.83		
	6	4.67	0.49		
T15. Feels positively	1	3.00	0.96	0.013	**0.000**
	3	3.79	0.80		
	6	4.58	0.51		
T17. Empathetic	1	3.64	1.01	0.237	**0.003**
	3	3.93	1.07		
	6	4.67	0.65		
T20. Solving problems	1	3.29	1.07	0.168	**0.001**
	3	3.64	0.84		
	6	4.58	0.67		
T21. Self-reliant	1	2.21	1.12	**0.025**	**0.000**
	3	3.00	0.88		
	6	4.08	0.51		
T22. Appreciating oneself	1	2.00	1.18	0.060	**0.000**
	3	2.64	0.93		
	6	3.75	0.87		
T23. Knowing oneself, understanding oneself	1	2.79	1.19	0.145	**0.002**
	3	3.21	0.89		
	6	4.17	0.94		
T24. Understanding others	1	3.21	0.80	0.237	**0.001**
	3	3.43	0.76		
	6	4.33	0.89		
Positive behaviour (overall)	1	82.71	19.07	0.075	**0.000**
	3	92.36	15.14		
	6	111.92	11.58		

To sum up the research findings, it can be stated that different studies show that humans find a variety of ways in which interact with animals. With the domesticated animals people are sharing daily lives. Animals are involved in sports, entertainment (Hollin, 2021) or they have positive therapeutic effect, like

Dolphin assisted therapy in Lithuania which is a medical and licenced practice (Lietuvos Respublika, 2023). Unfortunately, despite the limitations of dolphin assisted therapy research the major investigated groups of patients in a history were targeted towards cognitive, social, behavioural changes in children with autism, Down syndrome, Rett syndrome, developmental delays (Kreiviniene, Mockeviciene & Alijosiene, 2021; Nathanson, 1989; 1998; Nathanson, deCastro, Friend, & McMahon, 1997; Breitenbach, Stumpf, Fersen & Ebert, 2009; Lotan, 2007). The presented study covers adults with organic depression, which has closest comparison to the study of Bin MdYusof & Kok Hwee Chia (2012) where Chandler's psychosocial session form and other validated instruments showed significant change in reduction in stereotyped behaviors and a significant improvement in communication and social interaction in high functioning autism. The study of Birch (1998) could support this research findings from the bioacoustics perspective that people being in the water with dolphins are affected positively with endorphin release by dolphin's bioacoustics sonar. Similar findings using validated psychosocial instruments were measured in swim-with-dolphins program with healthy adults (Webb & Drummon, 2001). However, the methodologically closest conducted studies of Kamioka et al., (2014) and Antonioli & Reveley (2005) proves this study findings that after 2-week dolphin assisted therapy patients with depression experience betterment in severity of depressive symptoms, lower level of anxiety, has significant improvement in social involvement, participation, and self-perception. Therefore, it can be stated that dolphin assisted therapy is effective method to apply not only in mild and moderate depression but also as an effective complementary method for organic depression.

Conclusions

- The research results show that psychosocial characteristics of the patients suffering from depression have statistically significantly changed, patients' self-assessment of health has changed statistically significantly, significantly increased physical activity as well as decreased feeling of pain have been recorded, statistically significant decrease of negative characteristics of depression and more positive self-assessment, team spirit, empathy, self-reliance have been reported. This allows us declaring that the dolphin assisted therapy significantly changes welfare of people suffering from organic depression when assessing both physical and psychosocial parameters. However, it is necessary to conduct long-term measurements in the future to find out for how long these changes remain.
- After analysing 33 sessions of the dolphin assisted therapy, it was found out that the dolphins behaved positively during the sessions. In 31 sessions, the dolphin behaviour was characterised as positive, in 2 as more positive than

negative. There were no sessions when the dolphin behaviour would be evaluated as more negative than positive or fully negative.

- After analysing the dolphin behaviour in all three parts of the therapy, it was discovered that the dolphin behaviour remained positive throughout an entire DAT session: the median for the part 1 of the DAT sessions was 3.833, for the part 2 it was 3.857, for the part 3 it was 3.857 (where 1 is negative behaviour; 2 – more negative than positive behaviour; 3 – more positive than negative behaviour; 4 – positive behaviour). As no statistically significant difference among the medians was found, the behaviour can be described as stable.

- The research revealed that the positive and stable behaviour of the dolphins remained throughout an entire session. Such results allow drawing an assumption that existing conditions for the DAT are suitable for the dolphins. It is also important to note that the dolphins participate in the DAT sessions less often than in the course of the present research (the dolphins are rotated so that they would have more diverse activities). Often, a dolphin takes part in a DAT session for a half of the set time and is then substituted by another dolphin, so that activities were made more diverse for them. Regular conditions are much more simple than those for the research (when a dolphin participates in the DAT for ten consecutive days); therefore, it can be considered that the dolphins do not become tired during the DAT sessions.

- No other analogous research dealing with the dolphin behaviour during the DAT sessions were found in literature; therefore, the obtained results cannot be compared with results obtained by other researchers. Nevertheless, Trone & Kuczaj (2005) investigated the behaviour of dolphins who participated in dolphin-human entertaining swimming programmes. The researchers also assessed the frequency of dolphin behaviour and found out that the interactions were not harmful for the participating dolphins.

References

American Psychiatric Association. (2019). *Diagnostic and Statistical Manual of Mental Disorders. 5th ed.* Washington.

Antonioli, C., & Reveley, M. A. (2005). Randomised controlled trial of animal facilitated therapy with dolphins in the treatment of depression. *BMJ*, *331*(7527), 1231. https://doi.org/10.1136/bmj.331.7527.1231

Bin MdYusof, M.Sh., & Kok Hwee Chia N. (2012). Dolphin encounter for special children (DESC) program: Effectiveness of dolphin-assisted therapy for children with autism. *International Journal Of Special Education, 27*(3), 54-67. Retrieved from: https://files.eric.ed.gov/fulltext/EJ1001059.pdf

Birch, S. (1998). Dolphin sonar pulse intervals and human resonance characteristics. *IEEE Proceedings of the 2nd International Conference on Bioelectromagnetism,* 1998: 141 - 142.

Brakes P., & Williamson, C. (2007). Dolphin Assisted Therapy: Can You Put Your Faith in DAT? Whale and Dolphin Conservation Society. Retrieved from: https://uk.whales.org/wp-content/uploads/sites/6/2018/08/dolphin-assisted-therapy-report.pdf

Brando, S., Broom, D. M., Acasuso-Rivero, C., & Clark, F. (2018). Optimal marine mammal welfare under human care: Current efforts and future directions. *Behavioural Processes*, *156*, 16–36. https://doi.org/10.1016/j.beproc.2017.09.011

Breitenbach, E., Stumpf, E., Fersen, L. V., & Ebert, H. V. (2009). Dolphin-Assisted Therapy: Changes in Interaction and Communication between Children with Severe Disabilities and Their Caregivers. *Anthrozoös*, *22*(3), 277–289. https://doi.org/10.2752/175303709x457612.

Chandler, C. K. (2012). *Animal Assisted Therapy in Counseling*. https://doi.org/10.4324/9780203832103

Crystal, J. D. (2015). Animal models of source memory. *Journal of the Experimental Analysis of Behavior*, *105*(1), 56–67. https://doi.org/10.1002/jeab.173

Delfour, F., Monreal-Pawlowsky, T., Vaicekauskaite, R., Pilenga, C., Garcia-Parraga, D., Rödel, H. G., García Caro, N., Perlado Campos, E., & Mercera, B. (2020). Dolphin Welfare Assessment under Professional Care: 'Willingness to Participate', an Indicator Significantly Associated with Six Potential 'Alerting Factors.' *Journal of Zoological and Botanical Gardens*, *1*(1), 42–60. https://doi.org/10.3390/jzbg1010004

Delfour, F., Vaicekauskaite, R., García-Párraga, D., Pilenga, C., Serres, A., Brasseur, I., Pascaud, A., Perlado-Campos, E., Sánchez-Contreras, G. J., Baumgartner, K., & Monreal-Pawlowsky, T. (2021). Behavioural Diversity Study in Bottlenose Dolphin (Tursiops truncatus) Groups and Its Implications for Welfare Assessments. *Animals*, *11*(6), 1715. https://doi.org/10.3390/ani11061715

Dietch, J. T., & Zetin, M. (1983). Diagnosis of organic depressive disorders. *Psychosomatics*, *24*(11), 971–979. https://doi.org/10.1016/s0033-3182(83)73122-1

Grover, S., Sahoo, S., Chakrabarti, S., & Avasthi, A. (2019). Anxiety and somatic symptoms among elderly patients with depression. *Asian Journal of Psychiatry*, *41*, 66–72. https://doi.org/10.1016/j.ajp.2018.07.009

Gygax, L. (2017). Wanting, liking and welfare: The role of affective states in proximate control of behaviour in vertebrates. *Ethology*, *123*(10), 689–704. https://doi.org/10.1111/eth.12655

Hansen, A. H., & Kristoffersen, A. E. (2016). The use of CAM providers and psychiatric outpatient services in people with anxiety/depression: a cross-sectional survey. *BMC Complementary and Alternative Medicine*, *16*(1). https://doi.org/10.1186/s12906-016-1446-9

Hollin, C. R. (2021). *An Introduction to Human–Animal Relationships*. Routledge. http://books.google.ie/books?id=hRMtEAAAQBAJ&pg=PT2&dq=978-0-367-27759-8&hl=&cd=1&source=gbs_api

Kamioka, H., Okada, S., Tsutani, K., Park, H., Okuizumi, H., Handa, S., Oshio, T., Park, S. J., Kitayuguchi, J., Abe, T., Honda, T., & Mutoh, Y. (2014). Effectiveness of animal-assisted therapy: A systematic review of randomized controlled trials. *Complementary Therapies in Medicine*, *22*(2), 371–390. https://doi.org/10.1016/j.ctim.2013.12.016

Kapfhammer, H. P. (2006). Somatic symptoms in depression. *Dialogues in Clinical Neuroscience*, *8*(2), 227–239. https://doi.org/10.31887/dcns.2006.8.2/hpkapfhammer

Kreivinienė B., Mockevičienė D., Alijošienė E. (2021) Psychosocial and Neuro-Sensory Effect of Complex Dolphin Assisted Therapy for Children with Psychiatric and Behavioral Disorders. *Revista Argentina de Clínica Psicológica*, *30*(1),: 174-191. DOI: 10.24205/03276716.2020.2015

Lietuvos Respublikos papildomosios ir alternatyviosios sveikatos priežiūros įstatymas. 2020 m. sausio 14 d. Nr. XIII-2771, suvestinė redakcija 2023-07-01. Retrieved from: https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/3a4c78c03b6411eabd71c05e81f09716/asr

Lotan, M. (2007). Alternative Therapeutic Intervention for Individuals with Rett Syndrome. *The Scientific World JOURNAL*, *7*, 698–714. https://doi.org/10.1100/tsw.2007.4

Marino, L., & Lilienfeld, S. O. (1998). Dolphin-Assisted Therapy: Flawed Data, Flawed Conclusions. *Anthrozoös*, *11*(4), 194–200. https://doi.org/10.2752/089279398787000517

Marino, L., & Lilienfeld, S. O. (2007). Dolphin-Assisted Therapy: More Flawed Data and More Flawed Conclusions. *Anthrozoös*, *20*(3), 239–249. https://doi.org/10.2752/089279307x224782

Mcdonald M.E., Pace D., Blue E., & Schwartz D. (2012). Critical Issues in Causation and Treatment of Autism: Why Fads Continue to Flourish. *Child & Family Behavior Therapy* *34*(4):290-304. DOI:10.1080/07317107.2012.732849

Mellor D. J., Hunt S., & Gusset M. (2015). *Caring for Wildlife: The World Zoo and Aquarium Animal Welfare Strategy*. Gland: WAZA Executive Office.

Mendl, M., & Paul, E. (2004). Consciousness, emotion and animal welfare: insights from cognitive science. *Animal Welfare*, *13*(S1), S17–S25. https://doi.org/10.1017/s0962728600014330

Miller, L., & Campo, J. V. (2021). Depression in Adolescents. *New England Journal of Medicine*, *385*(5), 445–449. https://doi.org/10.1056/nejmra2033475

Nathanson, D. E. (1998). Long-Term Effectiveness of Dolphin-Assisted Therapy for Children with Severe Disabilities. *Anthrozoös*, *11*(1), 22–32. https://doi.org/10.1080/08927936.1998.11425084

Nathanson, D. E., de Castro, D., Friend, H., & McMahon, M. (1997). Effectiveness of Short-Term Dolphin-Assisted Therapy for Children with Severe Disabilities. *Anthrozoös*, *10*(2–3), 90–100. https://doi.org/10.2752/089279397787001166

Nathanson, D.E. (1989). Using Atlantic bottlenose dolphins to increase cognition of mentally retarded children. *Clinical and Abnormal Psychology*, 233-242, ed. P. Lovibond and P. Wilson. North Holland: Elsevier. Retrieved from: https://www.vin.com/doc/?id=3863792

Reisner, I. R., & Shofer, F. S. (2008). Effects of gender and parental status on knowledge and attitudes of dog owners regarding dog aggression toward children. *Journal of the American Veterinary Medical Association*, *233*(9), 1412–1419. https://doi.org/10.2460/javma.233.9.1412

Savičius, D. (2021). Somatinių depresijos simptomų, pasireiškiančių vyresnio amžiaus pacientams, gydymas. *Health Sciences*, *31*(3), 188–189. https://doi.org/10.35988/sm-hs.2021.107

Trone, M., Kuczaj, S., & Solangi, M. (2005). Does participation in Dolphin–Human Interaction Programs affect bottlenose dolphin behaviour? *Applied Animal Behaviour Science*, *93*(3–4), 363–374. https://doi.org/10.1016/j.applanim.2005.01.003

Ware J. E., Jr (2000). SF-36 health survey update. *Spine*, *25*(24), 3130–3139. https://doi.org/10.1097/00007632-200012150-00008

Webb, N. L., & Drummond, P. D. (2001). The Effect of Swimming with Dolphins on Human Well-Being and Anxiety. *Anthrozoös*, *14*(2), 81–85. https://doi.org/10.2752/089279301786999526

Williamson, C. (2008). Dolphin Assisted Therapy: can swimming with dolphins be a suitable treatment? *Developmental Medicine & Child Neurology*, *50*(6), 477–477. https://doi.org/10.1111/j.1469-8749.2008.00477.x

World Health Organization. Sixty-Fifth World Health Assembly. Geneva, Switzerland. Geneva 21-26, May. Retrieved from: https://apps.who.int/gb/DGNP/pdf_files/A65_REC1-en.pdf

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, *67*(6), 361–370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x