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The effects of goldfish on anxiety, fear, psychological and emotional well-being of hospitalized children: A randomized controlled study

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ABSTRACT

Aim: This study aimed to determine the effect of goldfish intervention on anxiety, fear, psychological and emotional well-being of hospitalized children.

Materials and methods: Between November 2020 and August 2021, an open-label, single-center randomized controlled experimental study was conducted in Türkiye's Eastern Anatolia region. The study included 112 children aged 8 to 10 years old (56 in the study group and 56 in the control group). The study and control groups were randomly assigned to strata using a table of random numbers. The children in the study group observed after goldfish intervention for three days. As data collection tools, the State-Trait Anxiety Inventory for Children, Child Fear Scale, and the Stirling Children's Well-being Scale were used.

Results: The mean state anxiety scores of the children in the study group who looked after goldfish intervention decreased significantly compared to the control group. When the two groups were compared, the difference between the post-test measurements were significant ($p < 0.05$). The mean score of the fear scale in the post-test measurements of the study group children was significantly lower than the control group ($p < 0.05$). Finally, the emotional, and psychological well-being post-test scale mean scores of the study group children were higher than the control group ($p < 0.01$).

Conclusion: Goldfish intervention was found to be effective in decreasing the state anxiety and fear levels and increasing the psychological and emotional well-being levels of the children in the study group.

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Introduction

Illness and hospitalization is an undesirable and stressful experience for every child in the growth and developmental age and his/her family (Sarman & Sarman, 2020). Hospitalized children face negative situations such as an unknown environment, unfamiliar people in this environment, unknown tools and equipment, frightening sounds, the thought of being physically harmed, separation from the family, and physical limitations (Delvecchio et al., 2019). All these cause the child to experience negative emotional states such as stress, frustration, anger, helplessness, anxiety, and fear (Üstün et al., 2014). It was reported in the literature that the emotional reactions developing in children due to hospitalization include anxiety (Delvecchio et al., 2019), fear (Foster & Park, 2012), stress (Christian, 2018), anger, loneliness (Rokach, 2016), introversion (Mazurek Melnyk, 2000), inhibition, and regression (Çelebi et al., 2015; Hägglöf, 1999).

Anxiety and fear are the most common negative emotions experienced by children during hospitalization (Delvecchio et al., 2019; Foster & Park, 2012). Anxiety is a subjectively felt emotion such as fear, worry, and tension and occurs when the integrity of the personality is threatened (Saraç, 2015). On the other hand, fear is defined as an emotional behavior and an undesirable reaction that occurs in the face of a real or unreal situation and danger (Gündüz et al., 2016).

Studies (Akşit & Cimete, 2015; da Silva et al., 2017) have reported that anxiety and fear of the child and his/her family may make it difficult for them to understand the information being given correctly, to make the right decision and to participate in care. Anxiety and fear may also decrease the child's cooperation with the healthcare team (Rodriguez et al., 2012). This may prolong the child's recovery process and decrease the quality of life (Möller et al., 2016). Therefore, it is critical to relieve the fears and anxieties of the child and his/her family and to make them feel better psychologically (Zarei & Negarandeh, 2021).

The evaluation and eradication of psychological (Theofanidis, 2007) and physiological (Üstün et al., 2014) difficulties brought on by the hospital environment and the sickness, as well as the promotion of psychological and emotional well-being, are major responsibilities of the

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healthcare team and the nurse who tends the child (İnal & Akgün, 2003). Pediatric healthcare nurses have an important role in the adaptation of the child and the family to the hospital and the disease (İnal & Akgün, 2003) and in the elimination of psychological problems such as anxiety and fear (Hsieh et al., 2012; Petronio-Coia & Schwartz-Barcott, 2020). In the hospital environment, various treatment methods such as therapeutic play (Yayan & Zengin, 2018), art therapy (Sarman & Günay, 2018), drawing (Petronio-Coia & Schwartz-Barcott, 2020), occupational therapy (Yılmaz et al., 2011), animal-assisted interventions/activities (AAA) (Goddard & Gilmer, 2015; Waite et al., 2018) are used to improve the child's coping skills and reduce negative emotions such as pain, anxiety, stress and fear.

Animal assisted interventions are activities that offer various opportunities to provide benefits such as distraction, improving quality of life, helping mental and physical relaxation, and entertainment (Delta Society, 2003). The basic philosophy of animal assisted interventions are based on the psychosomatic effect that occurs with biological, physical and chemical changes caused by human and animal interaction (Kruger & Serpell, 2010). Being in the same environment with an animal or keeping a pet for a long time plays a critical role in improving the physical, mental and social health of individuals (Gee et al., 2007). The positive aspects of keeping animals or being with different kinds of animals on individuals have been emphasized in the literature (O'Haire, 2010). These interventions can be performed on healthy and sick individuals in different developmental periods and used as a supportive treatment method in the elimination of physical and mental problems (Brown et al., 2019; Walden et al., 2020).

Florence Nightingale, the founder of modern nursing, was the pioneer of animal-assisted therapy (AAT) and AAA's with her foresight and innovative ideas. According to Cowell (Cowell, 2017), in book "Notes on Nursing" published in 1860, Nightingale stated her thoughts on the use of animals in treatment as "a small pet is an excellent companion for patients in the treatment process".

Animal-assisted interventions are performed with animals fed at home or with trained pet species (Wu et al., 2002). Cats, dogs, birds, horses, dolphins and some farm animals are used for this purpose (Meers et al., 2010). Studies show that interaction with such animals is psychologically, emotionally, socially and physically supportive and positively affects children's communication skills (Moreira et al., 2016).

Goldfish, which are included in the scope of animal-assisted intervention in this study, are one of the ornamental fish that are sold in >125 countries and >2500 species worldwide (Aydın, 2018). In recent years, keeping these fish in aquariums at houses and at workplaces has become a popular hobby and widespread in Türkiye (Aydın, 2019). There are limited number of studies on the effects of goldfish intervention on humans (Clements et al., 2019). In a systematic review examining the effects of interaction with goldfish on human health, the results of 19 studies in the literature were analyzed. All research examined in the current study were conducted on adults and it was reported that interacting with fish in home or public aquariums reduced anxiety and physiological stress findings and provided relaxation. It was reported that people who have goldfish at home see their fish as a source of friendship and establish an emotional bond with them, and that this bond would be psychologically beneficial (Clements et al., 2019). There is no study in the literature on the effect of goldfish on anxiety, fear, psychological and emotional well-being of children receiving treatment in a clinical setting, which is reported to have positive effects and provide calming when applied with various age groups (Friedmann, 1995).

Aim of the study

This study aimed to determine the effect of goldfish intervention on anxiety, fear, psychological and emotional well-being of hospitalized children.

Hypotheses

The hypotheses of this study are given below.

- H1.** Goldfish intervention decreases the anxiety levels of hospitalized children.
- H2.** Goldfish intervention decreases the fear levels of hospitalized children.
- H3.** Goldfish intervention increases the psychologically and emotionally wellbeing of hospitalized children.

Material and method

Study design

This study was conducted in an open-label, single-center randomized controlled experimental design.

Setting

This study was conducted in the pediatric department of a Children and Women's Health Hospital in eastern of Türkiye between November 2020 and August 2021. There are 35 patient beds, 12 nurses and 8 pediatric specialists in the pediatric department. Nurses have responsibilities such as measuring vital signs of children, providing treatment and care, monitoring complications and counseling families. Children who are hospitalized stay in the same room with their companions, their treatments are administered, and their care needs are met. There are no special interventions to reduce the anxiety and fear of hospitalized children.

Population and sample

In determining the sample size of the study, the studies conducted by Havener et al. in 2001 and Hinic et al. in 2019 to determine the effect of animal-assisted interventions on mood in pediatric age groups were utilized (Havener et al., 2001; Hinic et al., 2019). As a result, a total of 102 children with an effect size of 0.5, an alpha level of 0.05 (α), and a power range of 0.80 ($1 - \beta$) were determined to be included in the study sample. Given the possibility of losses during the study, the sample size was calculated to be 112 people in total, with at least 56 people in each group, about 10% more. The sample size was determined using power analysis. For this purpose, the G*Power 3.1.9.2 package program was used. There was no data loss during the study, and 112 children participated.

Inclusion criteria

Children who were hospitalized due to an acute illness in a children's hospital for at least three days, aged 8–10 years, were not afraid of the goldfish to be used in the intervention, were not allergic to fish and fish feed, and literate were included in the study.

Exclusion criteria

The diagnosis of physical, auditory, visual, and cognitive handicap (specified by the doctor) that may prevent the child from feeding the goldfish.

Elimination criteria

Children who did not complete the data collection tools and were discharged from the hospital before three days were eliminated from the study.

Randomization method

Patients' current data in the Hospital Information Management System (HIMS) was accessed and patients in the specified age range were included in the study group. Children were randomly assigned to the study and control groups to reduce selection bias and to control variables that may influence outcome variables. Assignment to the study and control groups was made by an independent statistician and with blinded technique to prevent bias and ensure confidentiality. Thus, selection bias was controlled by randomized assignment and concealment of randomization and data collection tools were applied. In this study, stratified randomization method was used. In such studies, the number of participants in the groups is expected to be similar and, if possible, equal (Kahan et al., 2015). In the study, two strata were formed as age (8, 9, 10) and gender (female, male) to ensure homogeneity in each group. A total of $3 \times 2 = 6$ combinations were obtained between the variables, thus limiting the imbalances that may occur in the groups with the stratified randomization method. Afterwards, the study and control groups were randomly assigned to the strata using a table of random numbers generated with the computer-based Research Randomizer program. The Random Allocation Software 1.0.0 package program was used to determine which letter would be the study or control group at the beginning of the study. During the course of the study, some of these combinations did not find patients in the appropriate stratum. However, this did not create an obstacle for stratification (Kamık et al., 2011).

Ethical considerations

This study was conducted in accordance with the Declaration of Helsinki Principles and based on a protocol registered at www.clinicaltrials.gov. Institutional permission and ethical approval from Inonu University Scientific Research and Publication Ethics Committee were obtained for the conduct of the study. Since the use of human subjects in the study requires the protection of individual rights, the condition of "informed consent" was met as an ethical principle. Individuals who participated in the study were informed that they were free to participate or not in the study and that they could leave the study at any time and that no fee would be charged. All individuals participating in the study were informed that personal information would not be disclosed to anyone else. Verbal consent was obtained from the children participating in the study and written and verbal consent was obtained from their parents. Furthermore, written permission was requested for all scales used in the study and approval for use was obtained. Also, considering the principle of equality, the children in the control group were given goldfish as a gift upon discharge.

Data collection tools

"Introductory Information Form", "the State-Trait Anxiety Inventory for Children (STAIC)", "the Children's Fear Scale (CFS)" and "the Stirling Children's Well-being Scale (SCWBS)" were used for data collection.

Introductory information form

This form prepared by the researchers consisted of 2 sections. The first section includes 10 questions on the child's sociodemographic characteristics such as gender, age, grade, number of siblings and information on whether the parents are alive and living together etc. In the second section, there are 8 questions on the child's disease characteristics, including information on the diagnosis and duration of the disease, the child's hospitalization experience, the child's history of disease, and whether the child has pets at home.

State-trait anxiety inventory for children (STAIC)

It is one of the most frequently used self-report tools to assess children's anxiety. It was developed by Spielberger (Spielberger, 1973) in 1973. It can be used at different time intervals in order to determine the changes that may be experienced in the process regarding anxiety. The inventory consists of two subscales: state and trait anxiety. There are 20 questions in each subscale and there are 40 questions in total. In the State Anxiety Inventory (SAI), children are asked to evaluate how they feel in the situation they are in "right now" and to indicate one of three options. Positive statements (I feel very calm, I feel very peaceful, I feel very rested, etc.) are scored between 10 and 30 and there are 10 (statements 1, 3, 6, 8, 10, 12, 13, 14, 17 and 20). Likewise, negative statements (I feel incredibly angry, I feel very restless, I feel very frightened, etc.) are scored between 10 and 30 and there are 10 statements (2, 4, 5, 7, 9, 11, 15, 16, 18 and 19). The scores to be obtained from the scale data vary between 20 and 60 (Spielberger, 1973). The higher the score, the greater the anxiety. After the positive and negative statements in the scale were grouped and summed within themselves, the resulting values were summed again and the total score of the scale was found. The scale was translated into Turkish by Özusta (Özusta, 1995). Validity and reliability activities were completed in 1993 with a total of 615 children studying in the 3rd, 4th, 5th, and 6th grades of primary school. The Cronbach-Alpha value of the scale was found to be 0.82. According to Günay (Günay, 2014), although the validity and reliability study of the scale was conducted with children aged 9–12 years, it is also used with children aged 7–17 years. In this study, only the state anxiety scale of the inventory was used and Cronbach-Alpha value was calculated to be 0.87.

Children's fear scale (CFS)

The CFS is used to measure the fear level of the child. It is a scale consisting of five drawn facial expressions ranging from neutral expression (0 points) to "no fear" face to "severe fear" scared face (4 points). The scale is intended for children aged 5–10 years (McMurtry et al., 2011). The CFS was developed based on the Faces Anxiety Scale by McKinley et al. (McKinley et al., 2003) to measure the fear or anxiety of adults hospitalized in the intensive care unit (Gerçekler et al., 2018; McMurtry et al., 2011). Families and researchers can easily use it to evaluate pain and fear before and during the procedure.

Stirling children's well-being scale (SCWBS)

It is a scale developed by Liddle and Carter (Liddle & Carter, 2015) to measure the emotional and psychological well-being levels of children between the ages of 8–15, consisting of 12 question items, ranging from "never" (1 point) to "always" (5 points), in accordance with the 5-point Likert model. There are no negative items in the scale. High scores obtained from the scale indicate an important level of emotional and psychological well-being for children. In the confirmatory factor analysis performed for the adaptation of the scale into Turkish by Akin et al. (Akin et al., 2016). The unidimensional model gave a good compliance. The item-total correlation coefficients of the scale ranged between 0.57 and 0.73 and the Cronbach-Alpha internal consistency coefficient was calculated as 0.90 (Kaya Memiş, 2018). In this study, Cronbach-Alpha value was calculated to be 0.85.

Procedure of the study

On the first day of hospitalization (two hours after the admission procedures were completed), the aim of the study and the interventions to be performed were explained to parents and the children who met the specified criteria. Children in the study group who agreed to participate in the study were asked about their allergic reactions and whether they had a fear of animals, and any unclear points were clarified again.

Intervention

The intervention process of the study was conducted in two stages: pre-intervention and nursing intervention.

Pre-intervention

Prior to the study, a preliminary study was conducted with 10 children who met the study criteria. The forms to be used in the study were applied to the children by practicing with goldfish as specified in the study. As a result of the pre-intervention, the comprehensibility of the questions was checked, and it was determined that the problems were comprehensible. The data of the children included in the pre-intervention were not included in the study group.

Data collection

The data were collected by the researcher between November 2020 and August 2021 by using data collection tools and face-to-face interview technique. The intervention flow chart of the study is shown in Fig. 1.

Intervention materials

Goldfish

The fish used in the study were goldfish, which is one of the ornamental fish with yellow, red and orange color mixtures (Aydn, 2018). The researcher consulted two veterinarians and two aquaculture

specialists and upon their advice, it was decided to use Japanese goldfish in the study.

These fish have a high body structure, a bulging belly, large eyes, a small mouth, and a forked caudal fin (Fig. 2). It is reported that these fish, whose life span varies between 6 and 30 years, can reach a length of 12–41 cm (Savaş et al., 2006).

Assisted materials used in intervention

Aquariums made of hardened, unbreakable transparent plastic with dimensions of 26 × 26 × 20 cm were used to prevent the aquarium from breaking and shattering in cases such as tipping and falling. The products used in the feeding process to the goldfish in the aquarium within the scope of AAA, which is performed twice a day, have a rich energy content. Easily loses its hardness as it softens quickly. It does not cause pollution in the water. The feeds were given by the children using gloves, masks, and goggles, 1 scoop (0.01 ml) at a time with the plastic spoon provided with the feed box. Only Japanese goldfish were kept in the aquarium, no decor materials (sand, algae, etc.) were used.

Changing the aquarium water is the most important part of tending to an aquarium. This regular change has benefits such as removing wastes like accumulated nitrate, maintaining water clarity, eliminating odors, and increasing available oxygen levels. This was done by the researcher every three days, using tap water that had been prepared at least one day before, allowed to stand, and rest.

Nursing intervention

The intervention steps and nursing interventions in this study are shown in Table 1. Medical care and treatment of the study and control

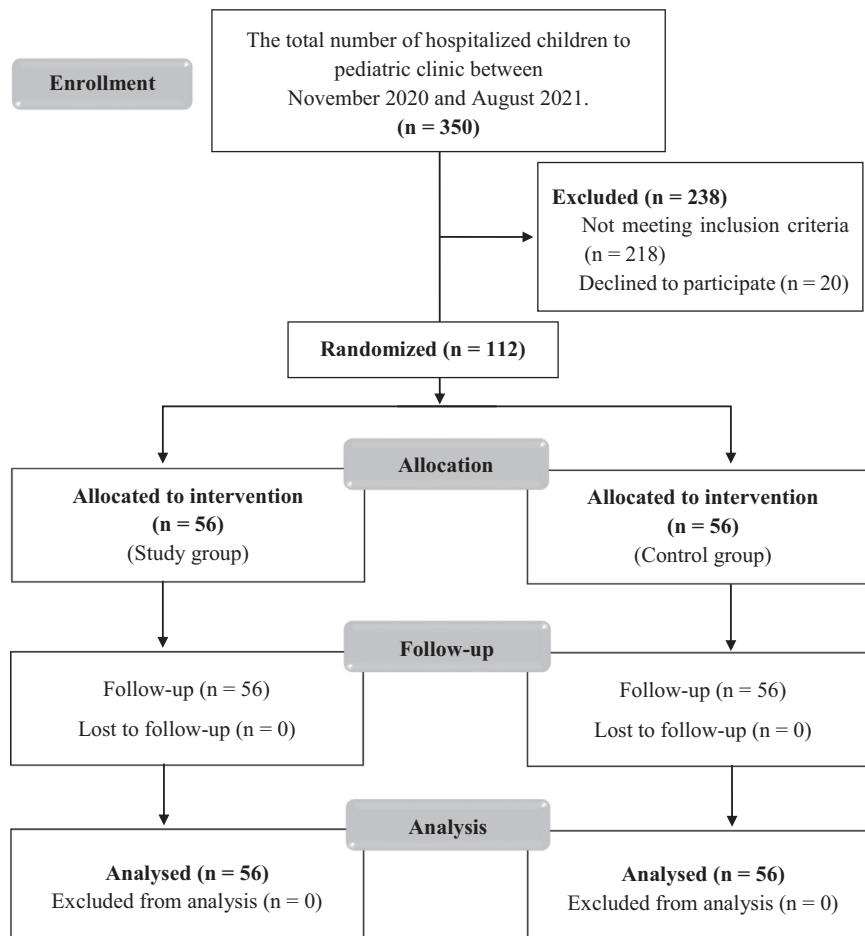


Fig. 1. Consort flow diagram.



Fig. 2. Goldfish used in the study.

group children continued in the same way. In addition, the goldfish intervention performed to study group.

Data analysis

Data were evaluated using IBM SPSS Statistics 22 (IBM SPSS, Türkiye) software. Chi-Square test was used to determine whether the data were normally distributed. Number, percentage, mean, and standard deviation were used in the evaluation of descriptive statistical data. Independent Sample *t*-test and Paired *t*-test were used to compare the control variables of the study and control groups. Independent Sample *t*-test, Paired *t*-test, and General Linear Model (GLM)-time series analysis were used to compare the pre-test and post-test mean scores of the study and control groups before and after the intervention.

Results

35.7% of the children were 9 years old, 55.4% were male, 96.4% attended primary school, and 30.4% were diagnosed with urinary infection in the study group (Table 2). Of the children in the control group, 35.7% were 9 years old, 51.8% were female, 98.2% attended primary school, and 25.0% were diagnosed with urinary infection (Table 2). No statistically significant difference was found between the descriptive characteristics of the children in the study and control groups ($p > 0.05$).

The difference between the mean SAI scores of the children in the study and control groups in the pre-test and mid-test on the first day was not statistically significant ($p > 0.05$). In the post-test performed on the third day, the difference between the mean anxiety scores was found to be statistically significant ($t = -2.403$, $p < 0.05$). In the intra-group comparison, the anxiety mean scores of the children in the study group gradually decreased and the difference between the anxiety mean scores in the pre-test, mid-test and post-test was statistically significant. The Bonferroni correction analysis showed that there was a difference between the pre-test and post-test, mid-test, and post-test state anxiety levels of the children in the study group ($p < 0.05$) (Table 3).

The difference between the pre-test mean scores of the study and control group children on the child fear scale was not significant

($t = 0.862$, $p = 0.391$). The mean fear scale score of the study group decreased significantly in the post-test compared to the control group and the difference between the two groups was significant ($t = -3.525$, $p = 0.001$). In the intra-group comparison, while there was a statistically significant difference between the means in the pre-test and post-test in the study group ($t = 6.581$, $p = 0.000$), there was no statistically significant difference in the control group ($p > 0.05$) (Table 3).

Table 3 shows the comparison of the mean SCWBS scores in the study and control groups. The difference between the mean SCWBS pre-test scores of the children in the study and control groups on the first day was not statistically significant ($t = -0.528$, $p = 0.598$). The mean post-test scores of the children in the study group increased compared to the control group and the difference between the two groups was significant ($t = 3.233$, $p = 0.002$). In the intra-group comparison, while there was a statistically significant difference between the means in the pre-test and post-test in the study group ($t = -8.165$, $p = 0.000$), there was no statistically significant difference in the control group ($p > 0.05$) (Table 3).

Discussion

This study demonstrated that the mean SAI of the children in the study group decreased significantly in the post-test, while the mean anxiety and fear scores of the children in the control group did not decrease. This result supports the hypothesis (H_1) that “**goldfish intervention decreases the anxiety levels of hospitalized children**”. Previous studies have shown that hospitalized children experience negative emotions such as stress and have high levels of state anxiety (Delvecchio et al., 2019; Vos et al., 2015). The experience of hospitalization can be stressful for both children and their parents and cause feelings such as anxiety and helplessness (Wu et al., 2002). It is highly critical to minimize the anxiety of hospitalized children, to ensure their relaxation and to help them overcome the thought of losing control due to the procedures and treatment processes in the hospital (Barkey & Stephens, 2000). In this study, when the children first faced to goldfish, a sense of curiosity aroused. Watching the movements of the fish in the aquarium, and caring for the fish directed the child to a different and entertaining area other than the disease. We believe that the state anxiety levels of children who spent

Table 1
Intervention steps in the study and control groups.

Study Group	Control Group
<ul style="list-style-type: none"> The researcher filled an introductory information form. 	<ul style="list-style-type: none"> The child and the family were informed about the study and their written and verbal consent was obtained.
<ul style="list-style-type: none"> On the first day, two hours after the child's hospitalization, pre-test data, the SAI, CFS, and SCWBS were recorded. 	<ul style="list-style-type: none"> The researcher filled an introductory information form.
<ul style="list-style-type: none"> The child and the family were informed for five minutes about the type, color, and characteristics of the goldfish, and two videos, each lasting three minutes and prepared by the researcher, were shown. 	<ul style="list-style-type: none"> On the first day, pre-test data, the SAI, CFS, and SCWBS were recorded
<ul style="list-style-type: none"> The goldfish was brought into the room of the child and introduced to the child and family for four minutes. 	<ul style="list-style-type: none"> One hour later, the SAI was performed again.
<ul style="list-style-type: none"> When the researcher brought the goldfish into the room, he/she first introduced the plastic aquarium and touched it. 	<ul style="list-style-type: none"> At the end of the third day, the post-test data of the SAI, CFS, and SCWBS were collected.
<ul style="list-style-type: none"> The child was asked to give the goldfish a name. In this way, the first step in bonding with the animal was completed. 	
<ul style="list-style-type: none"> The child was allowed to bond and spend time with the goldfish by touching the plastic aquarium for about five minutes. 	
<ul style="list-style-type: none"> Parents showed support during these procedures. 	
<ul style="list-style-type: none"> Any questions the child and family had about the goldfish were answered. If they did not have any questions, the plastic aquarium in which the goldfish would be kept was positioned in a place (on the patient's bedside table) where the patient and his/her family could easily see it. 	
<ul style="list-style-type: none"> The daily food of the goldfish was placed in a closed box next to the plastic aquarium. 	
<ul style="list-style-type: none"> The child and the family were informed for three minutes that the fish should be fed two times each day at 10.00 a.m. and 20.00 p.m. and that this should be done by the treated child after washing hands, and that gloves, masks and goggles should be used to prevent a situation caused by fish feed. On the first day, feeding was done together with the researcher. 	
<ul style="list-style-type: none"> One hour after the goldfish intervention was left next to the child, the SAI was performed again. 	
<ul style="list-style-type: none"> Each day after the goldfish was put in the room, the child and family were visited and assessed for any problems. 	
<ul style="list-style-type: none"> At the end of the third day, the post-test data of the SAI, CFS, and SCWBS were collected. 	
<ul style="list-style-type: none"> Patients were not allowed to take the fish out of their rooms to prevent the groups from influencing each other. 	
<ul style="list-style-type: none"> At the end of the third day, children who wanted to spend time with the goldfish were allowed to stay with the fish for a while longer. The fish was given as a gift to children who wanted to take it home and take care of it. 	

time with the fish during the day, took part in caring for the fish and watched its movements in the aquarium decreased. Studies in the literature support our findings.

Table 2
Descriptive characteristics of children in the study and control groups.

Descriptive Characteristics	Study Group (n = 56)		Control Group (n = 56)		Test and Significance χ^2/p
	n	%	n	%	
Age					
8	19	33.9	18	32.15	$\chi^2 = 0.056$ $p = 0.973$
9	20	35.7	20	35.7	
10	17	30.4	18	32.15	
Gender					
Female	25	44.6	29	51.8	$\chi^2 = 0.572$ $p = 0.449$
Male	31	55.4	27	48.2	
Grade					
Unable to attend school*	2	3.6	1	1.8	$\chi^2 = 0.500$ $p = 1.000^{**}$
Primary school	54	96.4	55	98.2	
Place of residence					
Village	5	8.9	7	12.5	$\chi^2 = 1.227$ $p = 0.541$
District/town	6	10.7	9	16.1	
Provincial center	45	80.4	40	71.4	
Child's co-residence					
Family	53	94.6	51	91.1	$\chi^2 = 0.538$ $p = 0.463$
Relative	3	5.4	5	8.9	
Co-residence status of mother and father					
Yes	53	94.6	51	91.1	$\chi^2 = 0.538$ $p = 0.463$
No	3	5.4	5	8.9	
Diagnosis					
Pneumonia/bronchopneumonia/bronchitis	10	17.8	8	14.3	$\chi^2 = 2.530$ $p = 0.772$
Urinary infection	17	30.4	14	25.0	
Gastroenteritis	9	16.1	11	19.6	
Respiratory tract infection	13	23.2	12	21.4	
Other*	7	12.5	11	19.6	
Duration of the disease					
1–7 days	31	55.4	30	53.6	$\chi^2 = 2.393$ $p = 0.495$
8–30 days	6	10.7	10	17.9	
31–90 days	19	33.9	16	28.5	
Previous hospitalization					
Yes	41	73.2	37	66.1	$\chi^2 = 0.676$ $p = 0.411$
No	15	26.8	19	33.9	
Frequently being sick					
Yes	26	46.4	24	42.9	$\chi^2 = 0.145$ $p = 0.704$
No	30	53.6	32	57.1	
Pet ownership status at home					
Yes	21	37.5	18	32.1	$\chi^2 = 0.354$ $p = 0.552$
No	35	62.5	38	67.9	
Type of pet animal					
Fish	8	38.1	10	55.6	$\chi^2 = 0.479$ $p = 0.237$
Cat	2	9.5	2	11.1	
Bird	11	52.4	6	33.3	

*Those who discontinued their education for a while due to the course of their disease, ** Fisher's Exact test, χ^2 Pearson Chi-Square test, * Skin rash/urticaria, muscle/joint pain, constipation.

Pediatric health nurses have responsibility in eliminating anxiety in children and increasing adaptation to the hospital (Braun et al., 2009). It has been reported that elimination of anxiety in children would increase the success of treatment (Rozanski & Kubzansky, 2005). Favara-Scacco et al. (Favara-Scacco et al., 2001) reported that children with low anxiety levels showed more cooperation during medical procedures. Lan et al. (Lan et al., 2012) stated that they experienced less fear, and Rozanski and Kubzansky (Rozanski & Kubzansky, 2005) reported that recovery times were shortened. Providing children with the opportunity to perform various activities that they can perform at home in the hospital environment makes it easier for them to get used to the environment they are in. For this purpose, activities such as animal-assisted practice help normalize the hospital environment. Such activities facilitate individual coping, relieve negative conditions such as pain, help reduce anxiety and provide psychological relief (Wu et al., 2002). Snipelisky and Burton (Snipelisky & Burton, 2014) expressed that children experience anxiety and stress because they could not fully understand the reasons for hospitalization or were inadequate in expressing their feelings. Different methods, including animal-assisted

Table 3
Comparison of the mean scores of children in the study and control groups on the State Anxiety Inventory, Children's Fear Scale, Stirling Children's Well-being Scale.

SAI	Study Group (n = 56)		Control Group (n = 56)		Test and Significance		Partial Eta Square
	$\bar{X} \pm SS$	$\bar{X} \pm SS$	t	p ^Δ			
Pre-test ^a	34.839 ± 7.898	32.785 ± 7.981	1.369	0.174	0.017		
Mid-test ^b	34.731 ± 7.688	32.714 ± 8.265	1.338	0.184			
Post-test ^c	28.750 ± 6.150	31.803 ± 7.252	−2.403	0.018			
F	20.529	1.422			0.050		
p ^Υ	0.000	0.250					
Bonferroni correction analysis	a*b = 1.000	a*b = 1.000					
	a*c = 0.000	a*c = 0.286					
	b*c = 0.000	b*c = 0.312					

CFS	Study group (n = 56)		Control group (n = 56)		Test and Significance		Cohen's d
	$\bar{X} \pm SS$	$\bar{X} \pm SS$	t	p ^Δ			
Pre-test	1.714 ± 1.397	1.482 ± 1.452	0.862	0.391	0.162		
Post-test	0.482 ± 0.786	1.178 ± 1.252	−3.525	0.001			
t	6.581	1.910			0.665		
p [†]	0.000	0.061					

SCWBS	Study group (n = 56)		Control group (n = 56)		Test and Significance		Cohen's d
	$\bar{X} \pm SS$	$\bar{X} \pm SS$	t	p ^Δ			
Pre-test	40.160 ± 6.295	40.785 ± 6.228	−0.528	0.099	0.099		
Post-test	46.214 ± 6.380	42.142 ± 6.934	3.233	0.611			
t	−8.165	−1.879			0.611		
p [†]	0.000	0.066					

Δ Independent Sample t-test, Υ General Linear Model test, † Paired t-test.

interventions, could be used to reduce this situation. Vagnoli et al. (Vagnoli et al., 2015) examined the effect of pet therapy on the anxiety levels of children aged 4–11 years before, during and after blood sampling and reported that anxiety decreased. Barker et al. (Barker et al., 2015) examined the effect of animal-assisted intervention using dogs on anxiety in hospitalized children. In their study, patients aged 8–18 years were allowed to interact with the animal for 10 min. It was reported that a strong emotional bond occurred between the patients and the dogs, and the anxiety levels of the children decreased. Pediatric nurses should use such practices to reduce anxiety in hospitals and clinics (Cardinal et al., 2017).

In this study, the fear level of the children in the study group gradually decreased compared to the control group. The difference between the study and control groups was found to be statistically significant ($p < 0.05$). This result supports the hypothesis (H₂) that **“goldfish intervention decreases the fear levels of hospitalized children”**. Hospitalization is a stressful, frightening, and confusing experience for pediatric patients and may lead to negative clinical outcomes. It is very beneficial to use pets to make the hospitalization experience less problematic for children (Wu et al., 2002). In this study, the children in the study group were less focused on the disease and distracted by watching the fish and taking responsibility for fish care. The goldfish given to the children in the study group turned the hospital stay into an enjoyable process and it was observed that the children were happy. Although literature states that animal-assisted intervention is effective in relieving fear. There are very few studies (Chubak et al., 2017; Vagnoli et al., 2015) supporting this idea. When the studies were examined, it was observed that horses, cats, dogs, birds, dolphins (Nathanson & de Faria, 1993) and some farm animals (Meers et al., 2010; Wu et al., 2002) were used for this purpose. Among these studies, Chubak et al. (Chubak et al., 2017) evaluated the effectiveness of an animal-assisted intervention with dogs on 19 hospitalized children with cancer, aged 7–17 years with an average age of 12.9 years, in a single 20-min session. After this activity with dogs, the patients experienced less anxiety and worry, and their fear levels decreased significantly. In the study conducted by Kaminski et al. (Kaminski et al., 2002), in which the effect of pet therapy on hospitalized children was examined and conducted on 70 children with an average age of 9.86 years, pet therapy sessions were applied once a week. It was determined that children found pet

therapy to be a positive experience, that it facilitated their coping with the problems related to hospitalization, and that salivary cortisol levels, which are used in the evaluation of anxiety, fear, and stress, decreased. Physical and visual contact with the animal creates a source of love and attention by increasing the sense of physical and emotional well-being in the person, thus encouraging people to express both positive and negative emotions such as fear (Jorgenson, 1997).

This study shows that the animal-assisted practice with goldfish enables children to establish a relationship and bond with a distinct species. The goldfish intervention helped to make the hospital environment safe and protective, facilitated children's adaptation to the hospital, helped them relax by reducing the feeling of loneliness, and was effective in reducing their fears.

In this study, the mean scores of the children in the study group on the SCWBS increased significantly in the post-test compared to the control group. The difference between the two groups was statistically significant ($p < 0.05$). This result supports the hypothesis (H₃) that **“goldfish intervention increases the psychologically and emotionally wellbeing of hospitalized children”**. The children who participated in the study frequently asked whether they could take the fish home, even though it was stated at the beginning of the study that they would be given as a gift. They were extremely happy when they were told that they could take the fish home with them. The fact that the children in the study group gave names to the fish that they thought they liked and watched all their movements in the aquarium, including feeding, suggests that the animals were adopted by the children, that they established a bond with the animal, and that these activities helped the children feel better and relaxed them (Clements et al., 2019; Friedmann, 1995). Clements et al. (Clements et al., 2019) reported that watching underwater images of animals, being involved in the care of animals and watching fish swim is a reflection of this effect with the potential to benefit human health.

Practice implications

The results of this study shows that using goldfish intervention is an effective method to reduce anxiety, fear and increase the psychological and emotional well-being in hospitalized children. The animal assisted practice may be utilized in clinical practice in order to reduce the level

of anxiety, fear, and increase the psychological and emotional well-being in hospitalized children. Nurses should be aware of the anxiety, fear associated with hospitalized. Reduction of could anxiety and fear contribute to the increase of children's psychological and emotional well-being. Pediatric nurses who work in the hospital should not neglect anxiety and fear assessment and follow evidence-based practices to effectively manage disease and apply it in the clinic.

Limitations of the study

This study has some general limitations. These are as follows:

- Having restrictive exclusion criteria that may reduce the generalizability of the findings,
- Having an interaction session for only three days (72 h) without examining any lasting effects over time,
- The sample of the research being limited to one hospital.

Strengths of the study

Compared to the studies in the literature, this study has some strengths that increase its reliability. These are as follows:

Although most studies (Bouchard et al., 2004; Havener et al., 2001) have intervention groups without a control group, in this study, comparison with the control group was possible. The clinic nurses' observation that the children in the study group caring for the goldfish experienced positive effects such as less crying during the day and faster adaptation to the clinical environment supported the study. Finally, although most of the studies using animal-assisted interventions (Barker et al., 2015; Wu et al., 2002) included a very short intervention (most of them were conducted as short interventions between 10 and 20 min), the duration of this study intervention was three days (72 h).

Conclusion and recommendations

In inter-group comparisons after the animal-assisted intervention, the state anxiety and fear levels of the children decreased, psychological and emotional well-being levels increased. After a while, it helped the children to see the hospital where they received inpatient treatment as a safe environment similar to the home environment they were used to.

Accordingly;

- It can be recommended that nurses should be aware of the negative effects of hospitalization on children and their families,
- That goldfish intervention be used to reduce the negative effects of the fear caused by hospitalization,
- That health professionals working with pediatric age groups should be informed about animal-assisted practices that are effective in children and their sensitivity should be increased,
- That goldfish intervention, which are effective in relieving anxiety and fear and providing psychological and emotional well-being in hospitalized children, should be included in nursing care within the scope of animal-assisted practices,
- Evidence-based studies evaluating the efficacy of different animal species on different ages and larger sample groups should be conducted.

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Ethical statements

All participants provided written informed consent prior to enrollment in this study. The study was approved by the human subjects' review boards of all participating institutions.

Note-1: This paper is based on the doctorate degree dissertation of the first author, carried out under the supervision of the second author.

Note-2: The number of figures in this paper is 2 and the number of tables is 5.

Data availability statement

Data are available, upon reasonable request, by emailing: "abdullah.sarman@hotmail.com".

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Abdullah Sarman: Conceptualization, Funding acquisition, Writing – original draft, Writing – review & editing. **Ulviye Günay:** Formal analysis, Writing – original draft, Writing – review & editing.

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References

- Akın, A., Yılmaz, S., Özen, Y., Raba, S., & ve Özhan, Y. (2016). Stirling Çocuklar İçin Duygusal ve Psikolojik İyi Oluş Ölçeği'nin Türkçe formunun geçerlik ve güvenilirliği. In V. Sakarya'da Eğitim (Ed.), *Araştırmaları Kongresi* (pp. 74–79). Sakarya: Sakarya University Institute of Educational Sciences Publications.
- Akşit, S., & Cimet, G. (2015). The effect of nursing interventions on the anxiety level of mothers after admission of their children to the intensive care unit. *Ç. Ü. Hemşirelik Yükseköğretim Dergisi*, 5(2), 25–36.
- Aydın, B. (2018). Knowledge and attitudes of college students about buying aquarium fish. *Ege Journal of Fisheries and Aquatic Sciences*, 35(4), 447–454.
- Aydın, B. (2019). Students' opinions and attitudes about retail aquarium stores. *Journal of Anatolian Environmental and Animal Sciences*, 4(3), 465–472. <https://doi.org/10.35229/jaes.632165>.
- Barker, S. B., Knisely, J. S., Schubert, C. M., Green, J. D., & Ameringer, S. (2015). The effect of an animal-assisted intervention on anxiety and pain in hospitalized children. *Anthrozoos*, 28(1), 101–112. <https://doi.org/10.2752/089279315X14129350722091>.
- Barkey, M. E., & Stephens, B. (2000). Comfort measures during invasive procedures: The role of the child life specialists. *Child Life Focus*, 2(1), 1–4.
- Bouchard, F., Landry, M., Belles-Isles, M., & Gagnon, J. (2004). A magical dream: A pilot project in animal-assisted therapy in pediatric oncology. *Canadian Oncology Nursing Journal*, 14(1), 14–17. <https://doi.org/10.5737/1181912x1411417>.
- Braun, C., Stangler, T., Narveson, J., & Pettingell, S. (2009). Animal-assisted therapy as a pain relief intervention for children. *Complementary Therapies in Clinical Practice*, 15(2), 105–109. <https://doi.org/10.1016/j.ctcp.2009.02.008>.
- Brown, S., Snelders, J., Godbold, J., Moran-Peters, J., Driscoll, D., Donoghue, D., Mathew, L., & Eckardt, S. (2019). Effects of animal-assisted activity on mood states and feelings in a psychiatric setting. *American Psychiatric Nurses Association*, 26(6), 555–567. <https://doi.org/10.1177/1078390319853617>.
- Cardinal, F. G., Arroyo, G. M., Magbanua, S., & Sajani, A. K. (2017). Measurement of anxiety in 3–9-year-old children receiving nursing intervention. *Journal of Caring Sciences*, 6(4), 293–302. <https://doi.org/10.15171/jcs.2017.028>.

- Çelebi, A., Aytekin, A., Küçüköğlü, S., & Çelebioğlu, A. (2015). Hospitalized children and play. *Izmir Dr. Behçet Uz Çocuk Hastanesi Dergisi*, 5(3), 156–160. <https://doi.org/10.5222/buchd.2015.156>.
- Christian, B. J. (2018). Translational research – The stress and uncertainty of hospitalization and strategies for pediatric nurses to improve the quality of care for children and families. *Journal of Pediatric Nursing*, 41, 140–145. <https://doi.org/10.1016/j.pedn.2018.05.012>.
- Chubak, J., Hawkes, R., Dudzik, C., Foose-Foster, J. M., Eaton, L., Johnson, R. H., & Macpherson, C. F. (2017). Pilot study of therapy dog visits for inpatient youth with cancer. *Journal of Pediatric Oncology Nursing*, 34(5), 331–341. <https://doi.org/10.1177/1043454217712983>.
- Clements, H., Valentin, S., Jenkins, N., Rankin, J., Baker, J. S., Gee, N., Snellgrove, D., & Sloman, K. (2019). The effects of interacting with fish in aquariums on human health and well-being: A systematic review. *PLoS One*, 14(7), 1–36. <https://doi.org/10.1371/journal.pone.0220524>.
- Cowell, D. R. (2017). *A clinical practice change initiative to incorporate animal assisted therapy in advanced practice registered Nurses' clinical practice for children and adolescents*. University of Southern Mississippi.
- Delta Society (2003). *Standards of practice for animal-assisted activities and therapy*.
- Delvecchio, E., Salcuni, S., Lis, A., Germani, A., & Di Riso, D. (2019). Hospitalized children: Anxiety, coping strategies, and pretend play. *Frontiers in Public Health*, 7, 250. <https://doi.org/10.3389/fpubh.2019.00250>.
- Favara-Scacco, C., Smime, G., Schilirò, G., & Di Cataldo, A. (2001). Art therapy as support for children with leukemia during painful procedures. *Medical and Pediatric Oncology*, 36, 474–480.
- Foster, R. L., & Park, J. (2012). An integrative review of literature examining psychometric properties of instruments measuring anxiety or fear in hospitalized children. *Pain Management Nursing*, 13(2), 94–106. <https://doi.org/10.1016/j.pmn.2011.06.006>.
- Friedmann, E. (1995). The role of pets in enhancing human well-being: Physiological effects. In I. Robinson (Ed.), *The Waltham book of human-animal interaction: Benefits and responsibilities of pet Wwnership* (pp. 33–53). Pergamon Press.
- Gee, N. R., Harris, S. L., & Johnson, K. L. (2007). The role of therapy dogs in speed and accuracy to complete motor skills tasks for preschool children. *Anthrozoös*, 20(4), 375–386. <https://doi.org/10.2752/089279307X245509>.
- Gerçekler, G.Ö., Ayar, D., Özdemir, Z., & Bektaş, M. (2018). Gaining of Children's state anxiety and Children's fear scale to Turkish language. *E-Journal of Dokuz Eylül University Nursing Faculty*, 11(1), 9–13.
- Goddard, A. T., & Gilmer, M. J. (2015). The role and impact of animals with pediatric patients. *Pediatric Nursing*, 41(2), 65–71.
- Günay, U. (2014). Aile merkezli bakımın kanserli çocuk ve ebeveynlerinin kaygı düzeyine etkisi. *Institute of Health Sciences. Doctorate thesis*. Erciyes Üniversitesi.
- Gündüz, S., Yüksel, S., Aydeniz, G., Aydoğan, R., Türksöy, H., Dikme, İ., & Efendiler, İ. (2016). Çocuklarda hastane korkusunu etkileyen faktörler. *Çocuk Sağlığı ve Hastalıkları Dergisi*, 59, 161–168.
- Hägglöf, B. (1999). Psychological reaction by children of various ages to hospital care and invasive procedures. *Acta Paediatrica*, 88(431), 72–78. <https://doi.org/10.1111/j.1651-2227.1999.tb01321.x>.
- Havener, L., Gentes, L., Thaler, B., Megel, M., Baun, M., Driscoll, F., Beiraghi, S., & Agrawal, N. (2001). The effects of a companion animal on distress in children undergoing dental procedures. *Issues in Comprehensive Pediatric Nursing*, 24(2), 137–152. <https://doi.org/10.1080/01460860118472>.
- Hinic, K., Kowalski, M. O., Holtzman, K., & Mobus, K. (2019). The effect of a pet therapy and comparison intervention on anxiety in hospitalized children. *Journal of Pediatric Nursing*, 46, 55–61. <https://doi.org/10.1016/j.pedn.2019.03.003>.
- Hsieh, Y.-C., Liu, H.-T., & Cho, Y.-H. (2012). Reducing fear in preschool children receiving intravenous injections. *Hu Li Za Zhi the Journal of Nursing*, 59(3), 79–86.
- Inal, S., & Akgün, M. (2003). Terapotik Communion of hospitalization child. *Atatürk Üniversitesi Hemşirelik Yüksekokulu Dergisi*, 6, 67–76.
- Jorgenson, J. (1997). Therapeutic use of companion animals in health care. *Image – the Journal of Nursing Scholarship*, 29(3), 249–254. <https://doi.org/10.1111/j.1547-5069.1997.tb00993.x>.
- Kahan, B. C., Rehal, S., & Cro, S. (2015). Risk of selection bias in randomised trials. *Trials*, 16, 405. <https://doi.org/10.1186/s13063-015-0920-x>.
- Kaminski, M., Pellino, T., & Wish, J. (2002). Play and pets: The physical and emotional impact of child-life and pet therapy on hospitalized children. *Children's Health Care*, 31(4), 321–335. https://doi.org/10.1207/S15326888CHC3104_5.
- Kamık, E., Taşdelen, B., & Erdoğan, S. (2011). Randomization in clinical trials. *Marmara Medical Journal*, 24, 149–155. <https://doi.org/10.5472/MMJ.2011.01981.1>.
- Kaya Memiş, A. (2018). Okul nezaket algısının ilkököl öğrencilerinin psikolojik ve duygusal iyi oluşları ile ilişkisinin incelenmesi. *Uludağ Üniversitesi*.
- Kruger, K. A., & Serpell, J. A. (2010). Animal-assisted interventions in mental health: Definitions and theoretical foundations. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy* (pp. 33–48) (3rd ed.). Academic Press. <https://doi.org/10.1016/B978-0-12-381453-1.10003-0>.
- Lan, Y.-P., Huang, Z.-H., Finley, G. A., & Zuo, Y.-X. (2012). Effects of the combination of mask preconditioning with midazolam pretreatment on anxiety and mask acceptance during pediatric inhalational induction and postoperative mask fear in children. *Chinese Medical Journal*, 125(11), 1908–1914.
- Liddle, I., & Carter, G. F. A. (2015). Emotional and psychological well-being in children: The development and validation of the Stirling Children's well-being scale. *Educational Psychology in Practice*, 31(2), 174–185. <https://doi.org/10.1080/02667363.2015.1008409>.
- Mazurek Melnyk, B. (2000). Intervention studies involving parents of hospitalized young children: An analysis of the past and future recommendations. *Journal of Pediatric Nursing*, 15(1), 4–13. [https://doi.org/10.1016/S0882-5963\(00\)80018-4](https://doi.org/10.1016/S0882-5963(00)80018-4).
- McKinley, S., Coote, K., & Stein-Parbury, J. (2003). Development and testing of a faces scale for the assessment of anxiety in critically ill patients. *Journal of Advanced Nursing*, 41(1), 73–79. <https://doi.org/10.1046/j.1365-2648.2003.02508.x>.
- McMurtry, C. M., Noel, M., Chambers, C. T., & McGrath, P. J. (2011). Children's fear during procedural pain: Preliminary investigation of the Children's fear scale. *Health Psychology*, 30(6), 780–788. <https://doi.org/10.1037/a0024817>.
- Meers, L., Stefanini, C., Sofie, D., Normando, S., Samuels, W. E., Kalmar, I., & Ödberg, F. (2010). Is it wise to involve animals in prisons and rehabilitation programs? A study conducted in Flanders (Belgium). *Journal of Veterinary Behavior*, 5(1), 50. <https://doi.org/10.1016/j.jvbeh.2009.09.023>.
- Möller, E. L., Nikolić, M., Majdandžić, M., & Bögels, S. M. (2016). Associations between maternal and paternal parenting behaviors, anxiety and its precursors in early childhood: A meta-analysis. *Clinical Psychology Review*, 45, 17–33. <https://doi.org/10.1016/j.cpr.2016.03.002>.
- Moreira, R. L., do Gubert, F. A., de Sabino, L. M. M., Benevides, J. L., Tomé, M. A., Martins, M. C., & de Brito, M. A. (2016). Assisted therapy with dogs in pediatric oncology: Relatives' and nurses' perceptions. *Revista Brasileira de Enfermagem*, 69(6), 1188–1194. <https://doi.org/10.1590/0034-7167-2016-0243>.
- Nathanson, D. E., & de Faria, S. (1993). Cognitive improvement of children in water with and without dolphins. *Anthrozoös*, 6(1), 17–29. <https://doi.org/10.2752/089279393787002367>.
- O'Haire, M. (2010). Companion animals and human health: Benefits, challenges, and the road ahead. *Journal of Veterinary Behavior*, 5(5), 226–234. <https://doi.org/10.1016/j.jvbeh.2010.02.002>.
- Özusta, H.Ş. (1995). Çocuklar için durumluk-süreklilik kaygı envanteri uyarılama, geçerlik ve güvenilirlik çalışması. *Türk Psikoloji Dergisi*, 10(34), 32–44.
- Petronio-Coia, B. J., & Schwartz-Barcott, D. (2020). A description of approachable nurses: An exploratory study, the voice of the hospitalized child. *Journal of Pediatric Nursing*, 54, 18–23. <https://doi.org/10.1016/j.pedn.2020.05.011>.
- Rodriguez, C. M., Clough, V., Gowda, A. S., & Tucker, M. C. (2012). Multimethod assessment of children's distress during noninvasive outpatient medical procedures: Child and parent attitudes and factors. *Journal of Pediatric Psychology*, 37(5), 557–566. <https://doi.org/10.1093/jpepsy/jss005>.
- Rokach, A. (2016). Psychological, emotional and physical experiences of hospitalized children. *Clinical Case Reports and Reviews*, 2(4), 399–401. <https://doi.org/10.15761/CCRR.1000227>.
- Rozanski, A., & Kubzansky, L. D. (2005). Psychologic functioning and physical health: A paradigm of flexibility. *Psychosomatic Medicine*, 67(Suppl. 1), S47–S53. <https://doi.org/10.1097/01.psy.0000164253.69550.49>.
- Saraç, T. (2015). *Ahi Evran Üniversitesi son sınıf öğrencilerinin gelecek kaygısı ve umutsuzluklarının incelenmesi*. Graduate School of Natural and Applied Sciences: Ahi Evran University.
- Sarman, A., & Günay, U. (2018). *The effect of calligraphy/calligraphy practice on the anxiety and depression of children who treated in child and adolescent psychiatry clinic*. Institute of Health Sciences. Master's Thesis: İnönü University.
- Sarman, A., & Sarman, E. (2020). An overlooked issue: Negative effects of child's hospital treatment on family and preventive nursing approaches. *University of Health Sciences Journal of Nursing*, 2(2), 113–120.
- Savaş, E., Şener, E., & Yıldız, M. (2006). Japon balıklarında (*carassius sp.*) embriyolojik ve larval gelişimin incelenmesi. *Istanbul Üniversitesi Veteriner Fakültesi Dergisi*, 32(3), 7–19.
- da Silva, S. G. T., Santos, M. A., de Floriano, C. M. F., Damião, E. B. C., de Campos, F. V., & Rossato, L. M. (2017). Influence of therapeutic play on the anxiety of hospitalized school-age children: Clinical trial. *Revista Brasileira de Enfermagem*, 70, 1244–1249. <https://doi.org/10.1590/0034-7167-2016-0353>.
- Snipelisky, D., & Burton, M. C. (2014). Canine-assisted therapy in the inpatient setting. *Southern Medical Journal*, 107(4), 265–273. <https://doi.org/10.1097/smj.000000000000090>.
- Spielberger, C. D. (1973). *Manual for the state-trait anxiety inventory for children*. Consulting Psychologists Press.
- Theofanidis, D. (2007). Chronic illness in childhood: Psychosocial adaptation and nursing support for the child and family. *Health Science Journal*, 1(2), 1–9.
- Üstün, G., Erşan, E. E., Kelleci, M., & Turgut, H. (2014). Evaluation of the psychosocial symptoms by several variables in the hospitalized children. *Cumhuriyet Medical Journal*, 36, 25–33.
- Vagnoli, L., Caprilli, S., Vernucci, C., Zagni, S., Mugnai, F., & Messeri, A. (2015). Can presence of a dog reduce pain and distress in children during venipuncture? *Pain Management Nursing*, 16(2), 89–95. <https://doi.org/10.1016/j.pmn.2014.04.004>.
- Vos, T., Barber, R. M., Bell, B., Bertozzi-Villa, A., Biryukov, S., Bolliger, I., Charlson, F., Davis, A., Degenhardt, L., Dicker, D., Duan, L., Erskine, H., Feigin, V. L., Ferrari, A. J., Ferrari, A. J., Fitzmaurice, C., Fleming, T., Graetz, N., Guinovart, C., Fleming, T., Haagsma, J., & Murray, C. J. L. (2015). Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: A systematic analysis for the global burden of disease study 2013. *Lancet*, 386(9995), 743–800. [https://doi.org/10.1016/S0140-6736\(15\)60692-4](https://doi.org/10.1016/S0140-6736(15)60692-4).
- Waite, T. C., Hamilton, L., & O'Brien, W. (2018). A meta-analysis of animal assisted interventions targeting pain, anxiety and distress in medical settings. *Complementary Therapies in Clinical Practice*, 33, 49–55. <https://doi.org/10.1016/j.ctcp.2018.07.006>.
- Walden, M., Lovenstein, A., Randag, A., Pye, S., Shannon, B., Pipkin, E., Ramick, A., Helmick, K., & Strickland, M. (2020). Methodological challenges encountered in a study of the impact of animal-assisted intervention in pediatric heart transplant patients. *Journal of Pediatric Nursing*, 53, 67–73. <https://doi.org/10.1016/j.pedn.2020.04.017>.
- Wu, A. S., Niedra, R., Pendergast, L., & McCrindle, B. W. (2002). Acceptability and impact of pet visitation on a pediatric cardiology inpatient unit. *Journal of Pediatric Nursing*, 17(5), 354–362. <https://doi.org/10.1053/jpdn.2002.127173>.

Yayan, E. H., & Zengin, M. (2018). Therapeutic play in child clinics. *Gümüşhane University Journal Of Health Sciences*, 7(1), 226–233.

Yılmaz, U., Oltuoğlu, H., Hanazay, B., & Aylaz, R. (2011). *Uğraş terapisinin kronik hastalıklı çocukların durumluk kaygı düzeylerine etkisi. Uluslararası Katılımlı 3. Ulusal Pediatri Hemşireliği Kongresi. Kongre Özet Kitabı, Sözel Bildiri.*

Zarei, N., & Negarandeh, R. (2021). The relationship between unmet needs of parents with hospitalized children and the level of parental anxiety in Iran. *Journal of Pediatric Nursing*, 57, e74–e78. <https://doi.org/10.1016/j.pedn.2020.11.010>.