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The effects of cartoon assisted endoscopy preparation package on children's fear and anxiety levels and parental satisfaction in Turkey

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ABSTRACT

Purpose: The study was conducted to determine the effect of the cartoon-assisted preparation package, developed for children undergoing an endoscopy procedure, on children's fear and anxiety levels and parental satisfaction.

Design and methods: The study was conducted in a randomized controlled experimental design between April 2018–July 2019. The study sample consisted of a total of 65 children and their parents (33 in the intervention group and 32 in the control group) who met the research inclusion criteria in this study population. The intervention group was prepared for an endoscopy procedure with the cartoon-assisted preparation package for endoscopy.

Results: The mean fear scores of the children in the intervention group were 3.39 ± 0.56 before endoscopy, 1.67 ± 0.54 during endoscopy, and 0.52 ± 0.67 after endoscopy, with statistically significant difference between the mean fear scores. The mean fear scores in the control group were 3.00 ± 0.80 before endoscopy, 3.13 ± 0.79 during endoscopy, and 2.25 ± 1.16 after endoscopy, with statistically significant difference between the mean fear scores. The anxiety scores of the children were 33.79 ± 4.00 in the intervention group and 36.56 ± 3.52 in the control group before endoscopy, and the difference between anxiety scores was statistically significant ($p < 0.05$). The mean satisfaction scores of the parents in the experimental group after endoscopy (78.44 ± 10.01) was higher than that of the control group (73.52 ± 12.92), but the difference between the groups was not statistically significant ($p > 0.05$).

Conclusion: The cartoon-assisted preparation package for endoscopy was found to be effective in reducing fear and anxiety that may occur in children undergoing endoscopy, in the 7–12 age group.

Introduction

In all societies, children are individuals who are meticulously educated as adults of the future and whose needs are met by using the highest level of opportunities Thus, any acute or chronic illness in a child has an effect on the whole family, causing stress or crises (Törüner & Büyükgönenç, 2012). For the child, illness, hospitalization, and treatment are unpleasant experiences that frighten, disturb, and cause anxiety (Çavuşoğlu, 2013; Gökçay, Neyzi, & Baysal, 2010; Günay, Sevinç, & Aslantaş, 2017; Uysal, Düzkaya, Bozkurt, & Çöplü, 2018). The reaction of a child to a hospital stay and treatment procedures depends on their own previous knowledge, experience, expectations or dreams about the hospital (Bolat, 2018).

One of the procedures performed in a hospital that causes fear and anxiety in children is endoscopy, whether it be for diagnostic or therapeutic purposes. Gastrointestinal endoscopy is used to examine the mucosa of the esophagus, stomach, proximal duodenum, colon and terminal ileum, and it is increasingly being used in the diagnosis and treatment of these areas (Nguyen, Nguyen, & Nguyen, 2010; Yücel et al., 2016). In endoscopy, the process which is at least as important as the procedure is the process after the decision for endoscopy is made. The steps in the process, such as the initial diagnosis, pre-intervention procedures, vascular access, separation from the mother, and anesthesia, can cause great stress for both the child and the parent. To reduce their anxiety, it is very important to talk to the child and the parents about the process, explain why the procedure is necessary, identify the possible risks, and answer any questions they might have (Folayan, Faponle, Oziegbe, & Adetoye, 2014; Lightdale et al., 2014). Through this, the patient and their family can be assured that they will receive the best care during the procedure, that their privacy will be maintained and that the necessary equipment will be available should a complication arise, thus alieving their fears. Designing the treatment room to appeal to children can also reduce their anxiety (Folayan et al., 2014).

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There are many tools used to minimize the trauma experienced by pediatric patients from a serious illness, a hospitalization or a medical procedure. One of these tools is the watching of cartoons. In a study conducted by Aral, Ceylan, and Bıçakçı (2011), it was determined that the type of programming children watche due to their visuald most frequently and were most influenced by was cartoons due to their visual characteristics. When used appropriately, cartoons have entertaining, instructive, and informative value and can be a model to develop the character of a child (Bayır & Günsen, 2017; Ghilzai, Alam, Ahmad, Shaukat, & Noor, 2017; Özdemir & Ramazan., 2012). Cartoons can be educational tools that can model behaviors of right and wrong, beautiful and ugly, for children at an appropriate age (Şirin, 2017). In a study conducted in 2012, Lee et al. concluded that allowing pediatric patients to watch animated cartoons before a procedure is an effective method for alleviating their anxiety. Similarly, in another study, it was found that cartoon watching is a method that can be used in decreasing fear and anxiety (Cerne, Sannino, & Petean, 2015). Cartoons can occupy a large part in a child's world. Studies have determined that cartoons are mostly used as a method of distraction. Although foreign sources use cartoons to alleviate fear and anxiety in children (Cerne et al., 2015; Şirin, 2017), in Turkey the current practice is to change the negative behaviors of children that occur when they are stressed.

Both children and their parents should be included in the treatment process in pediatric care. The parents' input is important in evaluating the results of the care given in a hospital. Parents expect to be able to trust health care professionals, to be supported, to be informed, and for their child to be well cared for in a safe environment. Fulfilling the emotional, human, and physical needs of children during medical treatment increases parental satisfaction (Ulus & Gülümse, 2012). The aim of this study was to determine the effect of the use of a cartoon-assisted endoscopy preparation package on the fears and anxiety of children undergoing an endoscopy, as well as their parents' satisfaction.

Material method

Place and time

The research was performed in a randomized controlled experimental design, and the data were collected between July 2, 2018 and May 24, 2019 in an endoscopy unit in the Pediatric Minor Branches Clinic of a hospital in Erzurum, Turkey.

Population and sample

The population in this study consisted of children and their parents who were referred to the pediatric outpatient clinic of the aforementioned hospital between the specified dates and were given an appointment with a decision to undergo endoscopy for diagnosis and treatment. In this study, an a priori power analysis was performed to determine the sample size, and Cohen's standard effect sizes were chosen as the reference method (Çapık, 2014). In the power analysis, it was determined that the sample size should be 65 children and their parents, of which 33 children were in the intervention group and 32 were in the control group (n1:33, n2:32, X1:1,67, X2:3,12, SS1:0.55, SS2:0.79). The children were randomly assigned to the groups using "stratification and block randomization methods."

In the literature, it has been reported that age, gender, and fear of interventional procedures were among the factors affecting the fear and anxiety experienced by children in medical procedures (Çavuşoğlu, 2013; Erdoğan, Nahcıvan, & Esin, 2014; Törüner & Büyükgönenç, 2012). In the current study, it was found that the most important variables affecting children undergoing an endoscopy procedure were the fear of the procedure and their gender. The children were grouped as boy or girl for the gender variable and as afraid or not afraid for the fear of the procedure. Block randomization was performed, and 32 or 33 children were included in each of the study groups. In order to prevent the groups from being influenced by each other, the data of the intervention group were collected on Mondays and the data of the control group were collected on Tuesdays. The data collection days of the groups were determined using the lot method (Erdoğan et al., 2014). This cycle was continued until a sufficient sample size was reached.

Inclusion criteria

Children between 7 and 12 years of age who were literate, accompanied by their parents, did not have mental, visual, hearing or communication impairments, and had never previously had an endoscopy were included in the study. Parents who were literate, who had no mental, visual, or communication problems or disabilities, and who were willing to participate were included in the study.

Data collection tools

In order to collect the data, Descriptive Information Form, State-Trait Anxiety Inventory for Children, Children's Fear Scale, Newcastle Satisfaction with Nursing Scale (NSNS) and Physiological Parameter Recording Form were used.

Descriptive Information Form

The Descriptive Information Form, which was prepared by the researcher in accordance with the literature (Arslan, 2014; Çapık, 2014; Gerçeker, Ayar, Özdemir, & Bektaş, 2018; Işık, 2012; Kayaokay, 2016), includes a total of 12 questions: the child's age, gender, number of siblings, family type, place of residence, family income, mother's age, mother's education, mother's occupation, social security, and fear of the endoscopy. It took about 3–5 min to administer this form.

State-Trait Anxiety Inventory for Children (STAI-C)

This self-reporting scale was developed by Spielberger in 1973 to assess children's state and trait anxiety. It was translated and adapted into Turkish by Özusta (1995). The scale was divided into two separate scales containing a total of 40 items (20 state and 20 trait anxiety items). The child is asked to mark one of three options to assess how they feel "at the moment." Half of the items of the scale reflect the absence of uneasiness, anxiety, and tension; the rest reflect their existence. The highest score that can be obtained from the scale is 60 and the lowest score is 20. The Cronbach α value for the scale was found to be 0.82 (Özusta, 1995). In our study; Cronbach α value was found to be 0.77. It took about 5–8 min to administer this scale.

Children's Fear Scale

This scale was developed in 2011 by McMurtry et al. (2011) to measure a child's anxiety level, and a Turkish validity of the scale was conducted in 2018 by Gerçeker et al. The scale is intended to be used with children between the ages of 5 and 10, but some have suggested it can be used with children up to the age of 12 (Gerçeker et al., 2018). The child is shown five facial expressions, each representing a level on a scale between zero and four, where zero indicates no fear and anxiety and four indicates high level of fear and anxiety. This scale can be used to measure fear and anxiety before and during a procedure (Gerçeker et al., 2018). Cohen's Kappa coefficient was examined to determine inter-observer compliance. In our study, the value of kappa was found to be 0.91. It took about 3–5 min to administer this scale.

Newcastle Satisfaction with Nursing Scale (NSNS)

This scale was developed by Thomas, McColl, Priest, Bond, and Boys (1996) to determine patients' satisfaction with their nursing care. It was adapted into Turkish by Uzun in 2003 and later by Akın and Erdoğan in 2007. The scale is a 5-point Likert-type scale consisting of 19 items with not at all satisfied =1, barely satisfied = 2, quite satisfied = 3, very satisfied = 4, and completely satisfied = 5. The total score obtained

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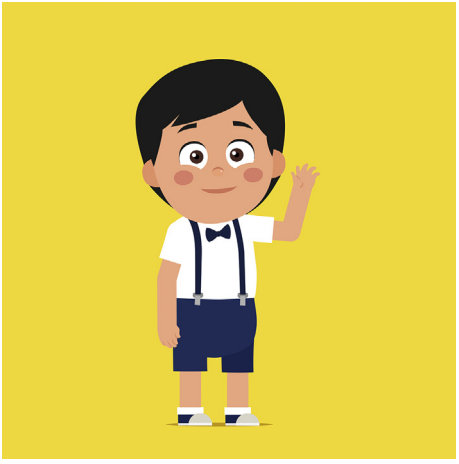
from the scale is calculated by converting the scores of all items to 100 after adding them. Total score was summed and transformed to yield an overall 'satisfaction score' of 0–100, where 100 denotes complete satisfaction/highest level of satisfaction with all aspects of nursing care (Akın & Erdoğan, 2007). The Cronbach α coefficient of the scale was found to be 0.94 in Uzun's (2003) study and 0.96 in Akın and Erdoğan's (2007) study. In our study, the α value was found to be 0.95. In Turkish society, the responsibility of the mother in childcare is quite high. As in many pediatric clinics, only one companion is admitted to the endoscopy unit, which is often the mother. Therefore, in our study; the data of the father of each of the children who underwent endoscopy could not be accessed and was not considered. It took about 5–8 min to administer this scale.

Physiological Parameter Recording Form

This form was developed by the researcher. Values before, during, and after endoscopy were recorded by measuring pulse and saturation from a pulse oximeter and by measuring all physiological parameters including respiration, blood pressure, and body temperature. It took about 4–5 min to administer this form.

Materials used in endoscopy preparation package and their properties

The package consisted of four parts: pillows with the Endocan character printed on them, cartoons, models and posters. The Endocan character, designed by the researcher, is a 7-year-old male. After many discussions with a production company, the character was physically designed and a cartoon animation was made.



Cartoon content

The cartoon tells the steps of the endoscopy process and takes 2 min and 3 s to view. The content of the cartoon includes the full process: the child arrives at the hospital, enters the clinic, meets the nurses, goes to the waiting room for a vascular access procedure, undergoes the vascular access procedure, receives the pillow as a gift, watches the cartoon in the waiting room, goes to the endoscopy room, is introduced to the endoscopy room and the devices to be used in the process, is told the steps of the endoscopy procedure including the anesthesia phase, goes to the rest room when the endoscopy process is finished and, when the effect of anesthesia wears off, wakes up in the rest room with his parents beside him.

Endocan doll printed pillow and its features

Before the procedure began, a pillow displaying Endocan, the character in the cartoon, was given to the children in the intervention group as a gift. The pillow was designed by the researcher, and it is the shape of a star with a size of approximately 50 * 50 cm. In the middle of the pillow, there is the picture of Endocan on a canvas cloth. None of the material used to make the pillow had the potential to cause allergies or respiratory aspiration in children. The purpose of giving the pillow as a gift to the children is to instill a feeling of trust in the child, who is encouraged to take the pillow to the procedure room after he watches the cartoon for companionship.

Features of Endocan doll model and posters

The Endocan model was designed and made of decota printing material, with a size of 120 * 30 cm and from a material that can stand with back support. The poster, intended to be hung on the doors, cupboards, and walls of the clinic, was printed in 90 * 70 cm size. The aim of having the models and posters in the environment is to provide continuity and to keep the character in the child's memory. The model of the Endocan character was used in many places in the clinic and endoscopy room to support the child and facilitate the adaptation to the procedure.

Endoscopy room

Oversized pictures of the cartoon character Endocan were posted on various parts of the endoscopy room (on the walls, material cupboards, and the door of endoscopy room) and a model was put on the door of the endoscopy room so that the child could make a connection with the cartoon watched before the procedure and the environment.

Implementation of nursing interventions

On the day in which the intervention group had their endoscopies, the environment was made suitable and a process preparation package (model, poster, pillow, cartoon watching) was applied. On the day the control group had their endoscopies, the process preparation package was removed from the environment and only routine applications were performed.

In the intervention group

The children first filled in the Descriptive Information Form in the room they were taken to wait when they came to the clinic at the appointment time for endoscopy. Next, the child's physiological parameters were measured and the values were recorded on the form, and then the Children's Fear Scale was applied. A pillow, on which the Endocan character was printed, was given to the child as a gift. After a vascular access was performed in preparation for the procedure, the child watched the cartoon of the Endocan character on the computer screen, showing the process of the endoscopy procedure. After the cartoon was watched, the State Anxiety Inventory for Children was applied, and the child was taken to the endoscopy room. In the endoscopy room, the Children's Fear Scale and their physiological parameters were measured for a second time, and the endoscopy procedure began. Before the procedure, the child was sedated by the anesthesia team. After the endoscopy procedure was complete, the child was taken to the rest room in the clinic to become stable and to wait for the effect of the sedation to wear off. Then the Children's Fear Scale and physiological parameter measurements were taken for the third time, and the NSNS was applied to the parents. Each repetition (second and third application) was used to compare the two groups.

In the control group

A clinical routine endoscopy procedure was performed on the members of the control group without any intervention, and the predetermined scales were applied. All materials in the intervention group were removed from the environment on the day of the control group's endoscopy. The children first filled in the Descriptive Information Form in the room they were taken to wait when they came to the clinic at the appointment time for endoscopy. Next, the child's physiological parameters were measured, the values were recorded on the form, and the Children's Fear Scale was applied. Vascular access was performed in preparation for the procedure and the State Anxiety

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Inventory for Children was applied. The child was then taken to the endoscopy room, where the Children's Fear Scale and their physiological parameters were measured for the second time. A routine endoscopy procedure was performed after the child was sedated by the anesthesia team. After the endoscopy procedure was completed, the child was taken to the rest room of the clinic to become stable and for the effect of the sedation to wear off. The Children's Fear Scale and physiological parameter measurements were applied for the third time and the NSNS was applied to the parents. Before they were discharged, each child was given a CD on which the cartoon was recorded and an Endocan pillow for compliance with ethical principles.

Data assessment

In the comparison of demographic data, Chi-square test (for non-normal distributions) was used for categorical variables, while independent groups *t*-test (for normal distributions) was used for continuous measurements. For the comparison of physiological parameters between the intervention and the control group, independent groups *t*-test (for normal distributions) and Mann Whitney-*U* test (for non-normal distributions) were used. For the pre-endoscopy, during endoscopy and post-intervention comparison of the physiological parameters in the intervention and the control group, variance analysis for dependent groups (LSD as advanced analysis) (for normal distributions) and Friedman test (Mann Whitney-U as advanced analysis) (for non-normal distributions) were used. For the pre-endoscopy, during endoscopy and post-intervention comparison of fear/anxiety levels in the intervention and the control group, variance analysis for dependent groups (LSD as advanced analysis) (for normal distributions) was used. Independent groups *t*-test (for normal distributions) was used to compare pre-endoscopy, during endoscopy and post-intervention comparison of fear levels in the intervention and the control group. Independent groups *t*-test (for normal distributions) was used to compare post-intervention satisfaction levels of parents. Pearson correlation analysis (for normal distributions) and Spearman correlation analysis (for non-normal distributions) were used to examine the association between pre-endoscopy, during endoscopy and post-intervention comparison of fear/anxiety levels and children's worry levels and parents' satisfaction levels. Logistic regression analysis was used in the logistic regression model which showed the effects of watching cartoon on worry, fear/anxiety and satisfaction levels. Kurtosis and skewness coefficients were used in the normality distribution of data, while Cronbach α coefficient was used for internal consistency. For all the analyses, the value of $p \leq 0.05$ was accepted as significant.

Ethical principles of the study

Ethics approval was obtained from the Ethics Committee of the Atatürk University Faculty of Medicine, and permission was obtained from the hospital where the study would be conducted. During the collection of the research data, individuals were informed about the study, and all written and oral approvals were obtained. Individuals who were willing to participate were included in the study and the Human Rights Helsinki Declaration was abided by during the study period to ensure individual rights were protected in the study.

Results

When the intervention and control groups were compared in the study in terms of the participants' demographic characteristics (gender, number of siblings, family type, place of residence, family income, mother's education, mother's occupation, social insurance, the state of being afraid of the procedure, the child's and the mother's age), it was found that the two groups were similar and there were no statistically significant differences between them ($p > 0.05$).

As shown in Table 1; the mean saturation of the intervention group before endoscopy was higher ($p < 0.05$). Heart and respiratory rates were found to be higher in the control group during endoscopy ($p < 0.05$). Heart rate and saturation values were found to be higher in the control group after endoscopy ($p < 0.05$) (Table 1).

When the intragroup physiological parameters were compared (Table 1), the average heart rate difference before, during and after the endoscopy in the intervention group was statistically significant ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (U), the average heart rate before the endoscopy (a) was found to be significantly higher than during the endoscopy (b) and after the endoscopy (c), while the heart rate during the endoscopy was found to be significantly higher than the heart rate after the endoscopy. This can be expressed as a > b > c. The average saturation difference before, during, and after the endoscopy was statistically significant in the intervention group ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (LSD), the average saturation before the endoscopy (a) was found to be significantly higher than during the endoscopy (b) and after the endoscopy (c), while saturation during the endoscopy was found to be significantly higher than after the endoscopy. This can be expressed as a > b > c. In the intervention group, the average respiratory rate before, during, and after the endoscopy was statistically significant ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (LSD), the average respiratory rate before the endoscopy (a) was found to be significantly higher than during the endoscopy (b) and after the endoscopy (c), while the respiratory rate during the endoscopy was found to be significantly higher than after the endoscopy. This can be expressed as a > b > c.

The average heart rate difference before, during and after the endoscopy in the control group was statistically significant ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (U), the average heart rate before the endoscopy (a) was found to be significantly lower than during the endoscopy (b). This can be expressed as a < b. The average saturation difference before, during and after the endoscopy was statistically significant in the control group ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (LSD), the average saturation during the endoscopy (b) was found to be significantly higher than before the endoscopy (a) and after the endoscopy (c). This can be expressed as b > a = c. In the control group, the average respiratory rate before, during and after the endoscopy was statistically significant ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (LSD), the average respiratory rate after the endoscopy (c) was found to be significantly lower than before the endoscopy (a) and during the endoscopy (b). This can be expressed as c < a = b (Table 1).

As can be seen in Table 2, the average fear score was 3.39 ± 0.56 before the endoscopy, 1.67 ± 0.54 during the endoscopy, and 0.52 ± 0.67 after the endoscopy in the intervention group. The average fear score difference before, during, and after the endoscopy in the intervention group was statistically significant ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (LSD), the average fear before the endoscopy (a) was found to be significantly higher than during the endoscopy (b) and after the endoscopy (c), while the average fear during the endoscopy was found to be significantly higher than after the endoscopy. This can be expressed as a > b > c. The average fear score was 3 ± 0.80 before the endoscopy, 3.13 ± 0.79 during the endoscopy, and 2.25 ± 1.16 after the endoscopy in the control group, and the difference between the average fear score was statistically significant ($p < 0.05$). In the advanced analysis conducted to determine the group that caused the difference (LSD), the average fear after the endoscopy (c) was found to be significantly lower than before the endoscopy (a) and during the endoscopy (b). This can be expressed as c < a = b.

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Table 1
Comparison of physiological parameters.

		Intervention group (n = 33)		Control group (n = 32)		
		Ave	SD	Ave	SD	
Body temperature	Before endoscopy[a]	36.55	0.23	36.63	0.26	
	During endoscopy[b]	36.57	0.21	36.59	0.20	$t = -1.313$, p = 0.194
	After endoscopy[c]	36.54	0.20	36.60	0.22	U = 520.500, p = 0.920
	Significance	$x_F^2 = 2.438$, p = 0.296		$x_F^2 = 2.317$, p = 0.314		U = 455.500, p = 0.331
Heart rate	Before endoscopy[a]	96.18	10.72	93.63	13.04	$t = 0.865$, p = 0.390
	During endoscopy[b]	92.12	8.89	99.06	12.86	$t = -2.538$, p = **0.014**
	After endoscopy[c]	89.45	8.14	95.03	10.18	U = 364.500, p = **0.031**
	Significance	$x_F^2 = 40.268$, p = **0.000**		$x_F^2 = 22.134$, p = **0.000**		
Systolic Blood Pressure	Before endoscopy[a]	98.48	6.19	97.19	8.88	$t = 0.681$, p = 0.499
	During endoscopy[b]	98.18	4.65	97.50	6.22	$t = 0.692$, p = 0.492
	After endoscopy[c]	98.18	5.84	96.25	7.07	$t = 1.203$, p = 0.234
	Significance	F = 0.057, p = 0.945		F = 0.926, p = 0.401		
Diastolic Blood Pressure	Before endoscopy[a]	56.67	5.95	55.63	6.19	t = 0.692, p = 0.492
	During endoscopy[b]	56.67	5.40	57.50	5.08	$t = 0.502$, p = 0.618
	After endoscopy[c]	57.58	5.02	55.94	5.60	$t = 1.243$, p = 0.218
	Significance	F = 0.522, p = 0.596		F = 2.305, p = 0.108		
Saturation	Before endoscopy[a]	99.12	6.09	99.00	6.41	$t = 2.659$, p = **0.010**
	During endoscopy[b]	98.97	5.15	98.38	5.58	$t = -1.808$, p = 0.075
	After endoscopy[c]	95.76	3.15	97.75	4.59	$t = -2.044$, p = **0.045**
	Significance	F = 56.835, p = **0.000**		F = 13.664, p = **0.000**		
Respiration	Before endoscopy[a]	25.45	1.89	24.63	2.61	$t = 1.471$, p = 0.146
	During endoscopy[b]	23.33	1.98	25.13	2.59	$t = -3.142$, p = **0.003**
	After endoscopy[c]	21.82	2.57	22.56	2.50	$t = -1.184$, p = 0.241
	Significance	F = 58.172, p = **0.000**		F = 20.888, p = **0.000**		

x_F^2=Friedman test, t = t-test for independent groups, U = Mann Whitney U testi, F = Variance analysis. Bold emphasis statistically significance at $p < 0.05$.

The average fear score difference between the intervention and the control group during the endoscopy was statistically significant ($p < 0.05$). The average anxiety score of the control group was found to be higher. The average fear score difference between the intervention and the control group after the endoscopy was also significant, with the control group having a higher average anxiety score. As can be seen in Table 2, the average anxiety score of the children in the intervention group before the endoscopy was 33.79 ± 4.00, while their average fear score was 3.39 ± 0.56. The average anxiety score of the children in the control group before the endoscopy was 36.56 ± 3.52, while their average fear score was 3 ± 0.80. The average fear and anxiety score difference between the intervention and control group before the endoscopy was statistically significant ($p < 0.05$). The control group was found to have a higher average anxiety score, while the intervention group was found to have a higher average fear score.

The average satisfaction score of the parents after endoscopy was 78.44 ± 10.01 in the intervention group and 73.52 ± 12.92 in the control group. The difference between the satisfaction scores of the parents in the intervention and control groups after the endoscopy was not significant ($p > 0.05$) (Table 3).

Table 4 shows that the relationship between the pre-endoscopy fear score and the anxiety level of the children was significant, positive and low in the control group ($p < 0.05$). As the fear score increases before the endoscopy, the anxiety level of the children also increases. The relationship between the pre-endoscopy fear score and the parental satisfaction level was not statistically significant ($p > 0.05$). There was no significant relationship between the fear scores after the endoscopy and the anxiety levels of the children ($p > 0.05$). The relationship between the fear score and the parental satisfaction level after the endoscopy was statistically significant, positive and low ($p < 0.05$). As the fear score increased, the parental satisfaction level also increased.

Table 5 shows that the package is a significant predictor of fear level. In the group which was given the cartoon-assisted endoscopy preparation package, the fear score was 0.124 times higher before the endoscopy, 10.5 times lower during the endoscopy and 7.9 times lower after the endoscopy ($p < 0.05$). The package is not a significant predictor on anxiety and satisfaction levels ($p > 0.05$).

Discussion

For children of all ages, illness, hospitalization, and all procedures applied in the hospital are a frightening experience (Çavuşoğlu, 2013; Gökçay et al., 2010). Children should be allowed to ask their doctor and medical team questions about their illness and treatment, such as what kind of procedures will be performed on them, what kind of treatment will be provided and what can happen as a result.

When the physiological parameters were compared between children in the intervention group and those in the control group, the average saturation of the intervention group was higher before the endoscopy. During the endoscopy, the control group had higher heart and respiration rates. After the endoscopy, the control group was found to have higher heart rates and saturation values (Table 1). Physiological parameters, which are the main indicators of health status, can be affected by many things, such as ambient temperature, physical

Table 2
Comparison of fear levels in children before, during and after endoscopy.

		Intervention group			Control group			Significance
		n	Ave	SD	n	Ave	SD	
Before endoscopy	Anxiety	33	33.79	4.00	32	36.56	3.52	$t = -2.966$, p = 0.004
	Fear	33	3.39	0.56	32	3.00	0.80	$t = 2.306$, p = 0.024
During endoscopy	Fear	33	1.67	0.54	32	3.13	0.79	$t = -8.689$, p = 0.000
After endoscopy	Fear	33	0.52	0.67	32	2.25	1.16	$t = -7.342$, p = 0.000
Significance		F = 275.93 p = 0.000			F = 11.202 p = 0.000			

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Table 3
Comparison of parental satisfaction levels with nursing care after endoscopy.

	Intervention group			Control group			Significance
	n	Ave	SD	n	Ave	SD	
Level of satisfaction	33	78.44	10.01	32	73.52	12.92	$t = 1.718$ $p = 0.091$

activity, physiological changes, exercise, anxiety, sudden stresses, chronic disorders, fear, anxiety and pain (Akça, 2013; Neyzi, Ertuğrul, & Özmen, 2010). A review of the literature shows a great number of methods are used to restore these conditions to normal levels, such as distraction through story reading, listening to music or watching cartoons (Bergomi, Scudeller, Pintaldi, & Molin, 2018; Thrane, Wanless, Cohen, & Danford, 2016). In a study conducted in 2019, Karaca examined the effects of musical toys on fear and anxiety related to vascular access and reported that the control group had higher respiration, saturation and heart rate values during the procedure. In a study by Aktürk (2017), the effect of guided imagery with music on the patient's physiological parameters in a bronchoscopy were examined, and it was reported that heart rate increased and saturation values decreased in the intervention group during the procedure.

The literature confirms that invasive procedures cause fear and anxiety in children (Çavuşoğlu, 2013; Gökçay et al., 2010). In our study, the average fear score before the endoscopy was higher in the intervention group, while the average score during the endoscopy and after the endoscopy was lower (Table 3). Fremont et al. (2018) stated that the problem of compliance in the inhaler treatment of children with asthma could be improved with the use of animated cartoons, and the cartoons could also reduce the fear and anxiety in these children. Lee et al. (2012) reported that watching cartoons decreased the fear experienced by children before being given anesthesia. Similarly, a study by Szeszak et al. (2016) found that showing cartoons to children who are about to have MRI without sedation both increases their adaptation to the process and decreases their level of fear.

In another study, Bergomi et al. (2018) stated that allowing children to watch cartoons during a procedure could be used to relieve anxiety, fear and pain (Bergomi et al., 2018). In a study conducted by Sakamoto et al. (2014) on primary school students, it was found that explaining the risk factors and symptoms of paralysis using a cartoon increased the children's satisfaction, and they continued their daily life as more informed, secure and with less fear. In a study conducted by Büyük and Bolışık (2018), it was reported that training given to children in the form of pre-operative therapeutic play reduced their level of fear after a procedure. Based on these findings, it can be said that watching cartoons before a medical procedure is an effective method to reduce the fear and anxiety in children. Similarly, the present study found that the use of a cartoon-assisted endoscopy preparation package had a significant effect on the fear experienced by the pediatric patient (Table 5). In the group with whom the package was used, the fear score was 0.124 times higher before endoscopy, while it was 10.5 times lower during endoscopy and 7.9 times lower after endoscopy ($p < 0.05$). These results show that using the package before the procedure contributes to decreasing the levels of fear among children. James, Ghai, Rao, and Sharma (2012) stated that allowing children to watch cartoons before an invasive procedure effectively decreases children's fear during and after the procedure (James et al., 2012). The literature further shows that, in a hospital environment, watching cartoons increases children's compliance with a procedure, and information given before the procedure decreases fear, anxiety and pain in children (Cerne et al., 2015; Jimeno et al., 2014; Kuo, Pan, Creedy, & Tsao, 2018; Lee et al., 2012). Results of the regression analysis conducted in this study were also found to be parallel with the literature.

Table 4
The relationship between fear scores and anxiety levels of children and parental satisfaction levels before, during and after endoscopy.

		Intervention group		Control group	
		Anxiety level	Satisfaction level	Anxiety level	Satisfaction level
Fear score before endoscopy	r	−0.299	−0.022	0.411	−0.115
	p	0.091	0.904	**0.019**	0.533
Fear score during endoscopy	r	−0.121	−0.057	0.228	0.108
	p	0.504	0.754	0.209	0.556
Fear score after endoscopy	r	−0.051	0.154	0.114	0.459
	p	0.776	0.393	0.534	**0.008**

Bold emphasis statistically significance at $p < 0.05$.

Table 5
Logistic regression model showing the effect of the package on the anxiety, fear level of children and parental satisfaction.[a]

	B	S.E.	Wald	p	Odd(s)	95% G.A.	
						Lower	Upper
Anxiety	−0.003	0.138	0.000	0.982	1.003	0.765	1.314
Fear before endoscopy	2.086	1.048	3.966	**0.046**	0.124	0.016	0.968
Fear during endoscopy	−2.358	0.961	6.018	**0.014**	10.575	1.607	69.609
Fear after endoscopy	−2.074	0.889	5.441	**0.020**	7.960	1.393	45.492
Level of satisfaction	0.116	0.061	3.657	0.056	0.890	0.791	1.003
Constant	−7.239	8.084	0.802	0.371	1393.269		

Bold emphasis statistically significance at $p < 0.05$.
[a] All variables were examined as continuous data.

Before the endoscopy, the average anxiety score was higher in the control group. There are many studies in the literature that confirm that informing the child and the family about the disease and its treatment will decrease the state of anxiety and worry in children (Çiftçi, Aydın, & Kataraş, 2016; Cimete, Kuğuoğlu, & Çınar, 2013; Gürol & Binici, 2017; Karaca, 2019; Törüner & Büyükgönenç, 2012).

In a study by Bergomi et al. (2018), it was found that having children watch cartoons decreased their anxiety and the anxiety of the parents. Similarly, Kuo et al. (2018) determined that in children about to undergo a vascular access procedure, watching informational cartoons reduces their anxiety. Jimeno et al. (2014) had similar results in a study of children visiting the dentist who were allowed to watch cartoons. In another study, Cerne et al. (2015) also found that having children watch cartoons can be used in reducing fear and anxiety. In this study, it was found that using the package with the intervention group effectively lowered the patient's anxiety level during and after the endoscopy (Table 2).

The difference between the satisfaction scores of the parents in the intervention and control groups after the endoscopy was not statistically significant ($p > 0.05$) (Table 3). It is reported in the literature that communication and information are the most important factors affecting patient satisfaction (Aldemir, Gürkan, Yılmaz, & Karabey, 2018; Ataman & Yarımoğlu, 2018; Turgu, Öztora, Çaylan, & Dağdeviren, 2018). Adequately informing the family members, improving the social and physical environment of the hospital, and making patients feel comfortable are important in terms of increasing service quality and satisfaction. In a study conducted by Ulus and Gülümse (2012), it was found that the satisfaction levels of informed mothers were higher than those of uninformed mothers. In studies by Yılmaz, Şentürk, Yalçın, and Başoğlu (2018) and Kayrakcı and Özşaker (2014), it was found that the mother's satisfaction with the nursing care was moderate, while in Uzun's (2003) study, the satisfaction with the nursing care was higher. The differences between our study and other studies may be because of the participant's educational or sociocultural characteristics, the differences between the hospitals, and the quality of the service of these hospitals. It can also be a result of the fact that the parents' expectations were met though the routine practices of the hospital rather than a decrease in their child's fear and anxiety.

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When the scales used in the study were examined in terms of groups, it was found that as the fear scores before the endoscopy increased in the control group, as did the children's anxiety (Table 4). In a study by Gönener and Görak (2009), where the children were informed about the hospital, disease and procedures, the pre-training average scores on anxiety-causing thoughts of the experimental group decreased after being given information, and the difference between the experimental group and the control group was statistically significant.

In a study by Taşkın (2018), it was found that there was a high statistically significant difference between the average scores before the procedure and after the procedure in regards to the anxiety experienced by children with the therapeutic practice method conducted before vascular access. The average anxiety scores of children in the control group were found to be higher than the experimental group. In a study by Büyük and Bolışık (2018), the pre-operation fear scores and anxiety increased in the control group.

A study by Bahadır (2016) looked at the effect of music therapy on the fear and anxiety levels in children who were undergoing surgery; the result of that study were similar to ours, indicating that the anxiety levels of children increased if their fear levels increased during and after endoscopy. A review of the literature reveals that the factors decreasing fear are the parents' educational status, whether the family has prepare the child for the procedure at home (such as by playing doctor and patient at home), whether the physician talks to the child during the examination, offering rewards and incentives for compliance, and informing the child before all medical procedures (Gündüz et al., 2016). Thus, our results concur with the literature, and our research question is answered.

Limitations of the study

It is within the limitations of this study that the response from a single parent as a companion is only obtained from the mother and that the cartoon images are specific to the hospital where the research is conducted.

The practice implications

Nurses who work with the children can use cartoons as a simple, distraction, and pleasurable intervention for the management of fear and anxiety.

Conclusion and suggestions

In this randomized controlled experimental study, it was found that when a cartoon-assisted endoscopy package was employed before a child had an endoscopy, the physiological parameters of the child were within more normal limits than in a child who had not had access to the package. Applied before an endoscopy, the package decreased the children's fear and anxiety levels, but had no effect on parents' satisfaction levels. Furthermore, as their fear score increased during and after the endoscopy, the children's anxiety level also increased; as the score increased before endoscopy in the control group, the children's anxiety level also increased.

In line with these results, it can be suggested that future research examine the effect of the package of different age groups, larger sample groups and to prepare children for endoscopy with the package as an alternative application to decrease children's fear and anxiety. It is also recommended that it be reproduced for other procedures or for other institutions.

Author contributions

Study conception/design; Semra Köse, Duygu Arıkan.

Data collection/analysis; Semra Köse.

Drafting of manuscript; Semra Köse, Duygu Arıkan.

Critical revisions for important intellectual content; supervision; Semra Köse, Duygu Arıkan Statistical expertise; Duygu Arıkan, Semra Köse.

Administrative/technical/material support; Semra Köse, Duygu Arıkan.

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