

## **Current Approach and Future Directions: Effect of Designed Video Based Learning Strategy on Endoscopy- Related Anxiety among Children and their Parents**

**Faten M. Nouh<sup>1</sup>, Reda A. Hassan<sup>2</sup>, Amal A. Fathalla<sup>3</sup>**

<sup>1</sup> Lecturer of Pediatric Nursing, <sup>2,3</sup> Assistant professor of Pediatric Nursing  
<sup>1,2,3</sup> Faculty of Nursing, Menoufia University, Egypt

**Abstract: Background:** Pediatric endoscopy is a widespread diagnostic and therapeutic procedure in children. However, it causes significant anxiety to children and their families. **Purpose:** To evaluate the effect of designed video based learning strategy on endoscopy- related anxiety among children and their parents. **Design:** A quasi-experimental research on two groups using pre and posttest design has been implemented. **Setting:** Endoscopy Unit of Menoufia University Hospital at Shebin El-Koom City, Menoufia Governorate, Egypt. **Sampling:** A purposive sample of 80 children undergoing endoscopy procedure and their parents. **Instruments:** Five instruments were utilized to collect data (A structured interview questionnaire, State-Trait Anxiety Inventory (STAI) Likert scale, Modified Yale Preoperative Anxiety Scale (m-YPAS), Measurement of saliva- cortisol levels and Procedural properties observational sheet). **Results:** There was a significant decrease in the total mean score of parental state and trait anxiety in the study group on post intervention ( $88.90 \pm 14.52$ ) than on pre intervention ( $118.35 \pm 16.97$ ). There was a significant reduction in total mean score of children's anxiety in the study group on post intervention ( $40.20 \pm 8.85$ ) than on pre intervention ( $75.66 \pm 11.11$ ). Children in the study group had significantly lower saliva-cortisol levels, shorter duration of sedation, endoscopy and recovery than children in the control group. **Conclusion:** The video-based learning strategy was successful in reducing endoscopy- related anxiety among children and their parents. Furthermore, the length of all stages of the procedure was dramatically lowered when the stress associated with endoscopy in children was reduced. **Recommendation:** Children should be provided with strategies to help them feel less anxious before to their endoscopy.

**Keywords:** Endoscopy- Related Anxiety, Video Based Learning Strategy

## **Introduction**

Pediatric endoscopy is a diagnostic and therapeutic method used by pediatric gastroenterologists to identify underlying organic pathologies in illnesses of the gastrointestinal tract in the pediatric population (Arıcan et al., 2020). Pediatric patients and their parents frequently show worry and anxiety about endoscopy because of the need for sedation or general anesthesia for pain and discomfort associated with the examination, as well as the danger of procedural errors such as bleeding or intestinal perforation. (Hagiwara et al., 2015; Riddhiputra & Ukarapol, 2021).

According to several studies, preoperative anxiety in children is linked to negative clinical, behavioral, and psychological outcomes, such as delayed recovery, increased postoperative pain, a greater need for analgesics, and the emergence of new unfavorable behavioral changes following surgery (Kain et al., 2020; Karling & Hägglöf, 2022; Kain et al., 2022). These alterations can be seen more than six months after discharge and include nightmares, separation anxiety, food issues, as well as an increase in fear of medical personnel (Vernon et al., 2019; Badner et al., 2020; Lichtor et al., 2020). Preoperative anxiety may cause behavioral symptoms in addition to triggering the stress response, which alters the inflammatory response and blood cortisol levels (McCann & Kain, 2020).

For the success of the gastrointestinal endoscopy and its positive consequences, a good understanding of

how to prepare children and their families by providing them with adequate information that minimizes anxiety, worries, and fears due to separation during the procedure is required. Parents should be involved during the pre-procedural educational session to aid in both the child's and parents' psychological preparedness. An age-appropriate description of the procedure for children and their parents is beneficial in reducing parental anxieties and allowing children to tolerate the procedure (Abdeldafie & Abraham, 2019; Lee et al., 2021; Winter et al., 2022).

One of the most crucial responsibilities of pediatric nurses is to provide patients with adequate information regarding the nature, course, and prognosis of their illnesses, as well as emotional and practical support for the child and his or her family while the child is in the hospital. The family must therefore be given sufficient explanations regarding the procedure and their respective responsibilities as the child's relatives. In addition to making children more cooperative and reducing their fear, preparing them for the procedure give them a sense of control when faced with a potentially difficult situation (Hockenberry & Wilson, 2018; Yubonpunt et al., 2021). To increase children and parental knowledge and practice, a variety of teaching techniques are employed, including lecture, demonstration, discussion, self-education, and teaching strategies supported by videos. A series of images representing situations in motion can be

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electronically captured, recorded, stored, transmitted, and rebuilt using a technique called video. Also, since pictures convey without words, it facilitates communication across language borders (Balasubramanian et al., 2020).

The video teaching technique enhances learning for both children and parents because it presents straightforward explanations of complicated themes and concerns using sight, sound, and action. Also, it can cross educational barriers and provide knowledge in a way that verbal explanations or conversation alone simply cannot. However, young children and parents who have difficulty with reading will benefit more from watching the video (Devi et al., 2022). Hearing the broadcaster's voice is an advantage of video-based learning. Additionally, it is possible to see the portrayed objects, movements, illustrations, and demonstrations. (Pradhan & Nayak, 2021). Accordingly, the purpose of this study was to determine whether a designed video-based learning technique could help children and their parents feel less stressed before an endoscopy.

**Significance of the study:**

In children, gastrointestinal endoscopy is a common diagnostic and treatment method. The frequency of endoscopies has significantly increased over the past few decades, and endoscopy is now a standard tool in pediatric gastroenterologists' every day. However, this procedure was shown to be a source of significant anxiety for children and their family practices

(Friedt & Welsch, 2020; Cadranel et al., 2021). Around 80% of patients expressed anxiety prior to having a pediatric gastrointestinal endoscopy, according to a thoughtful multicenter review of the condition (Squires & Colletti, 2021; Thomson et al., 2020; Johnston, 2022). Preoperative anxiety has been demonstrated in studies to have a negative impact on children's psychological and physiological health. (Vernon et al., 2019; Johnston, 2022). Consequently, prior to the procedure, children and their families should both get enough information. The need for this study stems from the fact that children who had more knowledge had less issues and would be less nervous and disturbed during subsequent endoscopies (Claar et al., 2020).

**Methods:**

**Purpose of study**

To assess the effect of designed video-based learning strategy on reducing endoscopy- related anxiety among children and their parents.

**Hypothesis:**

- 1) The following research hypotheses were developed to achieve the goal of this study:
- 2) Total mean scores of anxiety are lower for children undergoing endoscopy and their parents in the study group who received a designed video-based learning strategy compared to the scores for the control group who received routine hospital care.
- 3) Total mean scores of Saliva-Cortisol levels are lower for children who received a designed

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video-based learning strategy were undergoing endoscopy in the study group compared to the scores for the control group who received routine hospital care.

- 4) Total mean scores for duration of sedation, endoscopy and post-procedural recovery are shorter in the study group (children who received a designed video-based learning strategy) compared to the scores of children in the control group who received routine hospital care.

### **Research design:**

A quasi-experimental two-group pre-test and post-test design was adopted.

### **Setting:**

The research was carried out at the Endoscopy Unit of Menoufia University Hospital in Shebin El-Koom, Menoufia Governorate, Egypt.

### **Sampling:**

A purposive sample of 80 children undergoing upper or lower endoscopy and their parents were included in the study from the above-mentioned setting. They were divided into two groups at random.:

- Study group: received the video based learning (n=40)
- Control group: received routine hospital care (n=40)

**The following criteria were utilized to choose the study sample:**

### **Criteria for inclusion of children**

Children aged 6 to 18 years who were scheduled for upper or lower endoscopy.

### **Criteria for exclusion of children and parents**

- Previous history of any type of endoscopy both in the child and parents
- Severe mental and physical disabilities in children or parents
- Children with any endocrine disease state.

### **Sample size**

A purposive sample of 80 children was chosen based on this formula:

Where n is sample size, z is the z score,  $\hat{p}$  is the population proportion,  $\epsilon$  is the margin of error, z for a 95% confidence level is 1.96.  $\hat{p}$  for the population proportion is 0.068.  $\epsilon$  for the margin of error is 0.05.

$$n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\epsilon^2}$$

$$n = \frac{1.96^2 \times 0.068(1-0.068)}{0.05^2} =$$

**80 children**

Therefore, the study would necessitate a sample size of 80 children.

### **Instruments**

Five instruments were used to collect data.

### **Instrument one: Structured interview questionnaire:**

It was developed by the researcher to collect data about kids and their parents after reviewing related

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literature (Cadranel et al., 2021; Ozkan et al., 2021; Johnston, 2022). It was completed from parents and children's medical sheets. It contained two parts:

- **Part one:** Characteristics of studied parents. It contained information about parents' age, gender, educational background, place of residence, and number of children, hearing about endoscopy and whether they received anesthesia before.
- **Part two:** Characteristics of studied children. It contained information about child's age, gender, diagnosis, indications for endoscopy, types of endoscopy (upper or lower colonoscopy), types of sedation (general anesthesia, intravenous anesthesia or without sedation) and hearing about endoscopy.

**Instrument two: State-Trait Anxiety Inventory (STAI) Likert scale.**

This scale was adopted from Spielberger et al., (1983). It was a 40-item self-report anxiety scale for parents. It was divided into two subscales; 1) State-anxiety: It contained 20 items such as "I feel anxious," "I feel stressed," "I feel at ease," or "I feel secure" and so on. Responses were scored using a 4-point Likert scale. The scores ranged from 4 (very much so) to 1 (not at all). 2) Trait-anxiety subscale, 20 items which described how parents generally feel like "I worry too much about things that really don't matter," "I am happy," or "I am a steady person" and so on. Responses were measured on a four-point Likert scale. The ratings ranged from 4 (almost usually) to 1 (nearly

never). Total score for each subscale ranged from 20-80. Scores (20–39) showed no or minimal anxiety, (40–59) showed moderate anxiety, and (60–80) showed high anxiety. It was a valid scale intended to assess parental anxiety that had strong test-retest reliability. A Pearson coefficient of 0.93.

**Instrument three: Modified Yale Preoperative Anxiety Scale (m-YPAS).**

It was developed by Kain et al. (1997). It is an observational checklist scale that was developed to assess children's anxiety in the preoperative unit and during anesthesia induction. It was designed for children aged 5 years and older. It contained 22 items divided into five subscales: 1) activity (four items), 2) emotional expression (four items), 3) state of arousal (four items), 4) vocalization (six items) and 5) use of parents (four items). One-point score was provided for each item. The following method was used to obtain the total adjusted score:  $(\text{Activity}/4 + \text{emotional expression}/4 + \text{level of arousal}/4 + \text{usage of parents}/4 + \text{vocalization}/6) \times 100/5$ . The total score varied from 23.33 to 100, with more points indicating greater anxiety. It was a valid scale with strong test-retest reliability, with a Pearson coefficient of 0.86.

**Instrument four: Measurement of saliva- cortisol levels.**

Saliva- cortisol specimens were obtained by the researchers to determine the levels of stress in children undergoing endoscopy by

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taking saliva specimens from studied children and sending them to a laboratory outside the hospital setting.

**Instrument five: Procedural properties observational sheet.**

It included observation and documentation of duration of sedation (minutes), duration of endoscopy (minutes) and duration of recovery (minutes).

**Validity:**

To ensure validity, the five instruments were submitted to a panel of five pediatric experts (three professors in Pediatric Nursing and two professors in Pediatrics) to change any required instruments. All necessary changes were made to ensure their relevance and completeness.

**Pilot study:**

It was conducted on 8 children and 8 parents (10% of the sample) following the development of the instruments and prior to the beginning of data collection to test the practicability, applicability, and estimate the time required to fill the instruments. No essential changes were made.

**Ethical Consideration:**

An official approval was acquired from the Ethical Research Committee in the Faculty of Nursing, Menoufia University. Parents of studied children provided written agreement for their children's participation in the study. All participants were informed that their participation in the study was optional and that they could withdraw at any moment without penalty. Anonymity was preserved, and each participant's

confidentiality was safeguarded by assigning a code number to the questionnaire sheet. Participants were informed that the tool's content would be utilized solely for research purposes.

**Procedure:**

- Prior to data collection, written permission to conduct the study was obtained from the head of endoscopy unit after submitting an official letter from the Dean of the Faculty of Nursing at Menoufia University describing the goal of the study and data collection procedures.
- Data for this study were collected over a six-month period, from the beginning of November 2022 to the last day of April 2023. The researcher introduced herself to children and their parents and described the goal of the study and data gathering procedures.
- Children and their parents were randomly assigned to study or control groups. **The control group** was given routine care, whereas the study group had video-based learning which was provided by the researcher before endoscopy procedure. The researcher gathered sociodemographic information about the children and parents under study during face-to-face interviews using instrument one. Each interview for data gathering lasted 20 to 30 minutes.
- The researcher observed the intensity of anxiety among children in the study and control groups before endoscopy procedure using

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instrument two (pretest).The researcher assessed the intensity of parents' anxiety before endoscopy procedure in the study and control groups using instrument three (pretest).Saliva specimens were obtained by the researcher from all studied children in the study and control groups to measure saliva-cortisol level which provided an indication regarding children' stress level before endoscopy procedure (instrument four). All saliva samples were taken by having the kid expectorate into a cup. This was done in the same day of endoscopy early in the morning. Then, these specimens were sent to a laboratory outside the hospital (pretest).

- **For the study group**, one health education session was provided to studied children and parents and targeted towards minimizing children and parental anxiety prior to endoscopic procedures. It was provided by the researcher in the same day of endoscopy early in the morning after taking the saliva-cortisol specimen. The session included 2 - 4 participants (children and parents) and lasted for 45-60 minutes. Explanatory videos, group discussions and feedbacks were used for health education. Two explanatory videos, one explaining upper endoscopy and the other explaining lower endoscopy were designed by Motion Graphic and Video editing specialist with the scientific content being provided by the researchers. Animation was used in the creation of the videos to make them attractive to children who

watched them. It included detailed explanation of pre-procedural preparation at home, all steps of the endoscopy procedure from entering the endoscopy preparation room in the hospital to the time of discharge. Pre-procedural preparation at home included gastrointestinal preparation such as taking laxatives, times for stopping foods and fluids or any medications that should be discontinued before the procedure. In the hospital, parents should inform the health care providers regarding history of any allergies, any health problems, any previous surgeries, or blood clotting problems, descriptions regarding inserting an IV line, placing electrodes on child' chest, placing pulse oximeter on child's finger, induction of anesthesia, using face mask to inhale the anesthetic drug, intubation, extubation, the position, insertion of the endoscopy device that is an instrument supplied with a camera to allow the gastroenterologist to see inside the GIT. It also allows the gastroenterologist to take biopsy. The video also involved clarification of post-procedure observation period in the recovery room, measuring vital signs until the child become fully conscious, removing the IV line, introduction of fluids and food before discharge. Once the child become fully awake and able to walk on his/her own, the child can go home. Post procedural precautions, food and fluids to introduce, follow-up, and possible

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complications of the procedure were also explained.

- Then, the researcher took the children and their parents one by one in a tour to see the endoscopy room, the endoscope, the TV screen, the cardiac monitor, the pulse oximeter, the ventilator and the other components which were involved in the endoscopy room.
- The researcher permitted the child's parents to accompany them to the operation room and be present while the anesthesia was being administered.
- During endoscopy procedure, dose of sedation, duration of sedation and duration of endoscopy in the study and control groups were recorded by the researcher using instrument five. After endoscopy, duration of recovery and any complications occurred were recorded by the researcher using instrument five.
- Following the endoscopic procedure, children were transported to the waiting area till they were fully conscious, at which point they were taken back to their room. Children' anxiety level was observed using instrument two (posttest) and parents' anxiety level was assessed by the researcher using instrument three (posttest) in the study and control groups. Saliva specimens were obtained by the researcher from all studied children in the study and control groups to measure saliva- cortisol level using instrument four (posttest).

**Statistical Analysis:**

Data was input and analyzed using SPSS (Statistical Package for Social Science) version 22. The graphics were created with Excel. The mean (X) and standard deviation (SD) of quantitative data were displayed. It was analyzed using the student t-test to compare two means. The qualitative data were provided as a number and a percentage, and they were compared using the chi-square ( $\chi^2$ ) test. P-values under 0.05 are regarded as significant.

**Results:**

**Table 1:-** illustrates that more than two thirds of investigated parents in the study and control groups (67.5% & 62.5%) respectively, were between 26-34 years. The majority of parents in the study and control groups were females (87.5% VS 85%) respectively. Regarding educational level, more than two thirds of parents (67.5%) in the study group and less than half of them (45.0%) in the control group had high education. Half of parents (50.0%) in the study group had 2 children while less than half of them (45.0%) in the control group had 3 children. More than half of parents (55.0%) in the study group heard about endoscopy while more than half of parents (52.0%) in the control group hadn't heard about endoscopy before. About three quarters of parents in the study group and control groups (72.5% & 77.5%) respectively, had received anesthesia before.

**Table 2:-** clarifies that more than two thirds of studied children in the study and control groups (62.5% & 65.0%) respectively, were between 10-14



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years. Meanwhile, two thirds of studied children (60.0%) in the study group and more than two thirds of them (67.5%) in the control group were females. All of them had upper endoscopy for injection or banding esophageal varices. Also, all of them had given general anesthesia. More than two thirds of them (65.0%) in the study group and more than half of them (55.0%) in the control group had heard about endoscopy.

**Figure 1:-** shows that more than half of studied children in the study group (57.5%) had upper endoscopy while more than two thirds (65%) in the control group had lower endoscopy.

**Table 3:-** demonstrates that there was a significant reduction in mean scores of parental state and trait anxiety in the study group on post intervention ( $88.90 \pm 14.52$ ) than on pre intervention ( $118.35 \pm 16.97$ ). While no statistically significant changes in anxiety levels were identified between children in the control group on pre and posttests at the 5% level of statistical significance. There were statistically significant changes in parental anxiety between the study and control groups before and after intervention at the 1% level of statistical significance.

**Figure 2:-** shows that after intervention, there was a substantial reduction in state anxiety levels among parents in the study group compared to before intervention.

**Figure 3:-** illustrates that after intervention, there was a substantial reduction in trait anxiety levels among parents in the study group compared to before intervention.

**Table 4:-** clarifies that there was a significant reduction in mean scores of children' anxiety in the study group on post intervention ( $40.20 \pm 8.85$ ) than on pre intervention ( $75.66 \pm 11.11$ ). On the other hand, children in the control showed a significant increase in total mean score of children' anxiety on posttest ( $84.87 \pm 7.75$ ) than on pretest ( $76.53 \pm 11.99$ ). As a result, there were statistically significant variations in children's anxiety in the study and control groups at the 1% level of statistical significance on pre and post intervention.

**Table 5:-** indicates that there was a substantial drop in children's Saliva-Cortisol levels in the study group after intervention compared to before intervention ( $10.42 \pm 9.28$  vs  $13.50 \pm 12.65$ , respectively). On the other hand, there was a significant increase in children' Saliva- Cortisol levels in the control group on posttest than on pretest ( $20.63 \pm 11.85$  vs  $14.50 \pm 11.64$  respectively). Because of this, there were significant variations in children's Saliva-Cortisol levels between pre and post intervention in the study and control groups at the 1% level of statistical significance.

**Table 6:-** shows that children in the study group had shorter duration of sedation, endoscopy and recovery ( $11.00 \pm 2.53$ ,  $9.00 \pm 1.51$  &  $10.50 \pm 3.54$ ) respectively than children in the control group ( $14.02 \pm 3.50$ ,  $10.72 \pm 1.50$  &  $13.10 \pm 4.00$ ) respectively. Therefore, there were high statistical significance differences between the study and control groups regarding duration of sedation, endoscopy and

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recovery at 1% level of statistical significance.

**Table 7:-** reveals that there was a significant positive correlation between total state trait anxiety of studied parents and gender and history of receiving anesthesia, while there was a significant negative correlation between total state trait anxiety and number of children among parents in the study and control groups.

**Figure 4:-** clarifies that that there was a significant positive correlation between total state trait anxiety and educational level of parents in the study and control groups.

**Table 8:-** illustrates that there was a substantial positive link between total anxiety and the gender of the children in the study and control groups, but a significant negative correlation between total anxiety and the age of the children in the study and control groups.

**Figure 5:-** demonstrates that, on pre- and post-tests, there was a statistically significant positive association between children saliva-cortisol levels and their overall anxiety in the study and control groups.

**Table (1): - Characteristics of studied parents in the study and control groups.**

Items	Study group (n=40)		Control group (n=40)		X <sup>2</sup>	P- value
	No.	%	No.	%		
<b>Age</b>						
19-25 years	10	25.0%	13	32.5%	.66 <sup>ns</sup>	.716
26-34 years	27	67.5%	25	62.5%		
35 years and older	3	7.5%	2	5.0%		
<b>Gender</b>						
Female	35	87.5%	34	85.0%	.10 <sup>ns</sup>	.745
Male	5	12.5%	6	15.0%		
<b>Educational level</b>						
Primary education	2	5.0%	7	17.5%	5.19 <sup>ns</sup>	.075
Secondary education	11	27.5%	15	37.5%		
High education	27	67.5%	18	45.0%		
<b>Residence</b>						
Rural	17	42.5%	20	50.0%	.45 <sup>ns</sup>	.501
Urban	23	57.5%	20	50.0%		
<b>Number of children</b>						
1 child only	6	15.0%	6	15.0%	2.24 <sup>ns</sup>	.524
2 children	20	50.0%	15	37.5%		
3 children	10	25.0%	16	40.0%		
More than 3 children	4	10.0%	3	7.5%		
<b>Hearing about endoscopy</b>						
No	18	45.0%	21	52.5%	.45 <sup>ns</sup>	.502
Yes	22	55.0%	19	47.5%		
<b>Receiving anesthesia before</b>						
No	29	72.5%	31	77.5%	.26 <sup>ns</sup>	.606
Yes	11	27.5%	9	22.5%		

Note: (ns): not significant (p>0.05)

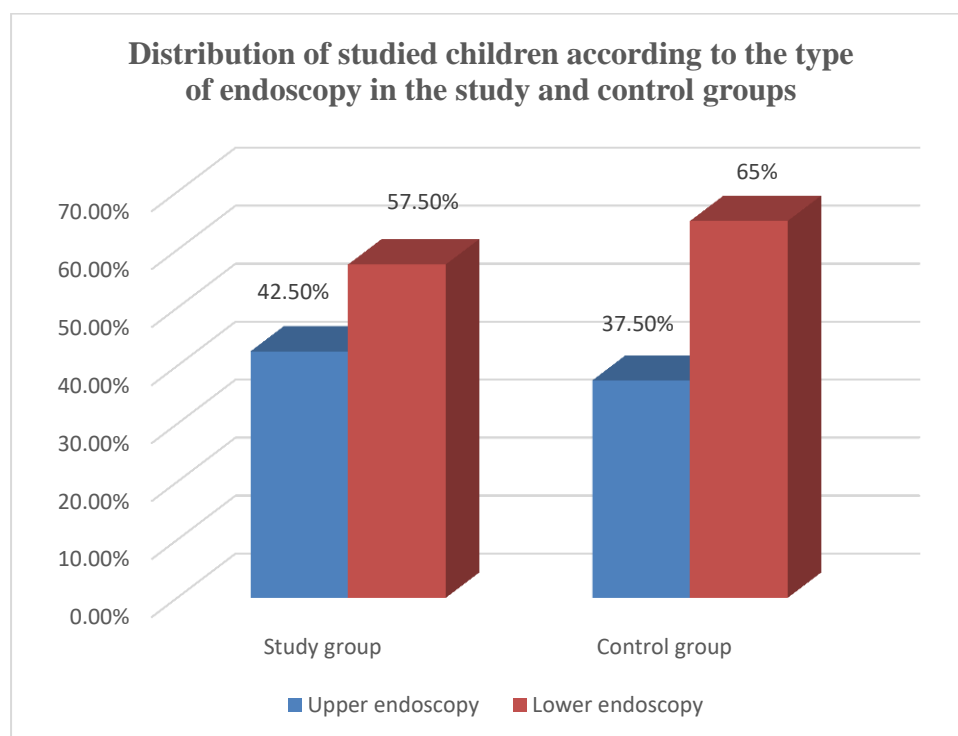
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**Table (2): - Characteristics of studied children in the study and control groups.**

Items	Study group (n=40)		Control group (n=40)		X2	P- value
	No.	%	No.	%		
<b>Age</b>						
6- 9 years	10	25.0%	10	25.0%	.13 <sup>ns</sup>	.937
10-14 years	25	62.5%	26	65.0%		
15-18 years	5	12.5%	4	10.0%		
<b>Gender</b>						
Female	24	60.0%	27	67.5%	.48 <sup>ns</sup>	.485
Male	16	40.0%	13	32.5%		
<b>Indication for endoscopy</b>						
Rectal bleeding	12	30%	14	35%	.27 <sup>ns</sup>	.964
Chronic diarrhea	11	27.5%	11	27.5%		
Abdominal pain	9	22.5%	8	20%		
Hematemesis	8	20%	7	17.5%		
<b>Type of sedation</b>						
IV sedation	40	100.0%	40	100.0%	No statistics are computed	
<b>Hearing about endoscopy</b>						
No	26	65.0%	22	55.0%	.83 <sup>ns</sup>	.361
Yes	14	35.0%	18	45.0%		

Note: (ns): not significant (p>0.05)

**Figure (1): - Distribution of studied children according to the type of endoscopy in the study and control groups.**



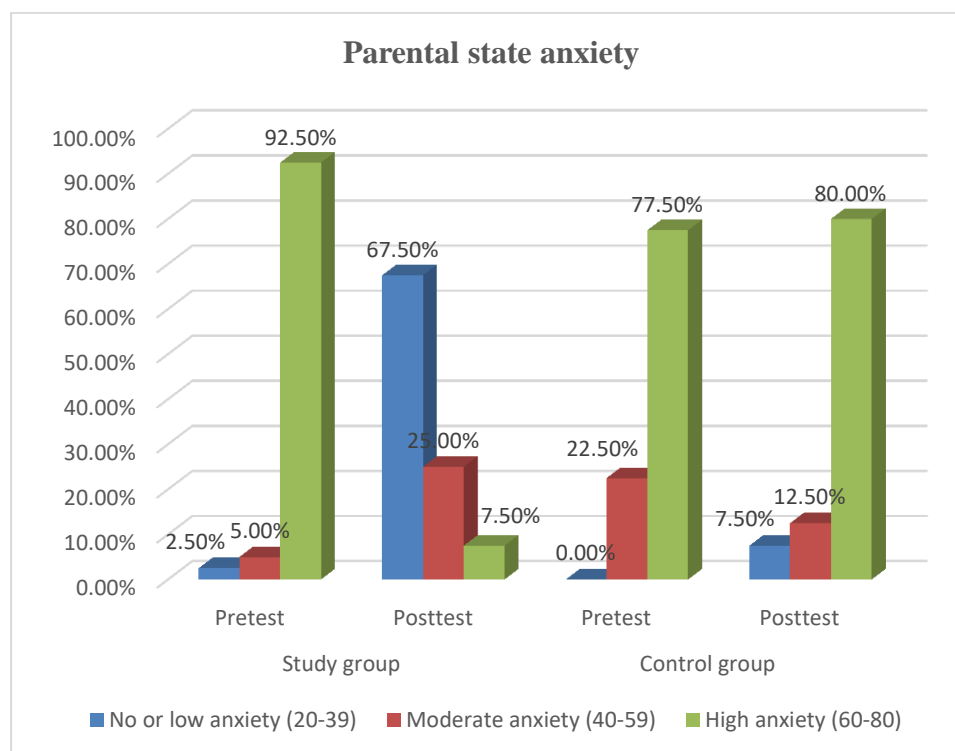
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**Table (3): - Comparison between mean scores of parental state and trait anxiety in the study and control groups on pre and post intervention.**

Parental anxiety (X ± SD)	Study group (n=40)	Control group (n=40)	Independent t- test	P-value
<b>State anxiety</b>				
Pre intervention	61.75 ± 11.17	55.32 ± 11.63	2.519 <sup>S</sup>	.014
Post intervention	42.25 ± 9.13	55.57 ± 12.55	-5.429 <sup>HS</sup>	.000
<b>Paired t test</b>	8.544 <sup>HS</sup>	-.092 <sup>ns</sup>		
<b>P- value</b>	.000	.927		
<b>Trait anxiety</b>				
Pre intervention	56.60 ± 6.21	53.27 ± 8.11	2.057 <sup>S</sup>	.043
Post intervention	46.65 ± 6.02	54.17 ± 8.19	-4.677 <sup>HS</sup>	.000
<b>Paired t test</b>	7.267 <sup>HS</sup>	-.493 <sup>ns</sup>		
<b>P- value</b>	.000	.623		
<b>Total state trait anxiety</b>				
Pre intervention	118.35 ± 16.97	108.60 ± 19.51	2.496 <sup>S</sup>	.014
Post intervention	88.90 ± 14.52	109.75 ± 20.50	-5.248 <sup>HS</sup>	.000
<b>Paired t test</b>	8.338 <sup>HS</sup>	-.257 <sup>ns</sup>		
<b>P- value</b>	.000	.798		

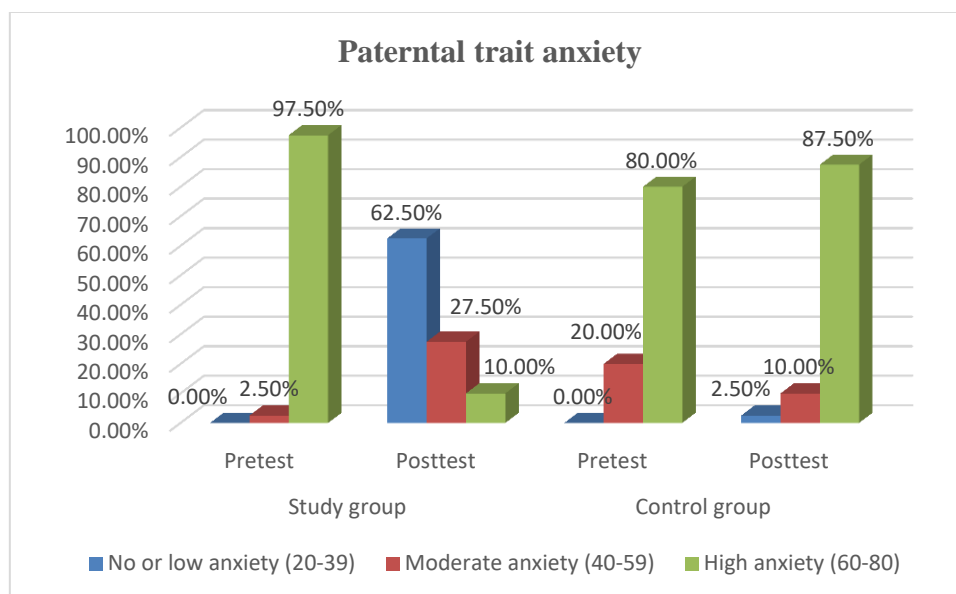
Note: (HS): High significant (p<.001) S: Significant (p<0.05) ns: not significant (p>0.05)

**Figure (2): - Distribution of parents regarding state anxiety levels in the study and control groups on pre and posttests.**



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**Figure (3): Distribution of parents regarding trait anxiety levels in the study and control groups on pre and posttest.**



**Table (4): - Mean scores of anxiety among children in the study and control groups on pre and post intervention.**

Children anxiety (Mean ± SD)	Study group (n=40)		Control group (n=40)		Independent t- test (P-value)
	Pre intervention	Post intervention	Pre intervention	Post intervention	
<b>Activity</b>	3.07 ± 0.91	1.15 ± 0.36	3.25 ± 0.80	3.50 ± 0.64	-20.206 <sup>HS</sup> .000
Paired t- test (P-value)	12.354 <sup>HS</sup> .000		-1.533 <sup>ns</sup> .129		
<b>Vocalization</b>	4.47 ± 1.10	1.72 ± 0.71	4.25 ± 1.37	4.80 ± 1.15	-14.276 <sup>HS</sup> .000
Paired t- test (P-value)	13.177 <sup>HS</sup> .000		-1.936 <sup>ns</sup> .056		
<b>Emotional expressiveness</b>	2.92 ± 0.85	1.75 ± 0.40	2.95 ± 0.90	3.30 ± 0.79	-9.240 <sup>HS</sup> .000
Paired t- test (P-value)	6.679 <sup>HS</sup> .000		-1.842 <sup>ns</sup> .069		
<b>State of apparent arousal</b>	3.12 ± 0.79	1.82 ± 0.38	3.20 ± 0.79	3.57 ± 0.63	-10.991 <sup>HS</sup> .000
Paired t- test (P-value)	7.400 <sup>HS</sup> .000		-2.337 <sup>S</sup> .022		
<b>Interaction with parents/ use of parents</b>	3.00 ± 0.78	2.20 ± 0.20	3.15 ± 0.80	3.40 ± 0.70	-5.437 <sup>HS</sup> .000
Paired t- test (P-value)	3.524 <sup>S</sup> .001		-1.477 <sup>ns</sup> .144		
<b>Total anxiety</b>	75.66 ± 11.11	40.20 ± 8.85	76.53 ± 11.99	84.87 ± 7.75	-24.001 <sup>HS</sup> .000
Paired t- test (P-value)	15.562 <sup>HS</sup> .000		-3.691 <sup>HS</sup> .000		

Note: (HS): High significant (p<.001) S: Significant (p<0.05) ns: not significant (p>0.05)

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**Table (5): - Mean scores of Saliva- Cortisol levels among children in the study and control groups on pre and post intervention.**

Saliva- cortisol level (Mean ± SD)	Study group (n=40)	Control group (n=40)	Independent t- test	P-value
Pre intervention	13.50 ± 1.65	14.50 ± 1.64	-.368 <sup>ns</sup>	.714
Post intervention	10.42 ± 0.28	20.63 ± 0.85	-4.178 <sup>HS</sup>	.000
Paired t test	1.239 <sup>HS</sup>	-2.349 <sup>S</sup>		
P- value	.000	.021		

Note: (HS): High significant (p<.001) S: Significant (p<0.05) ns: not significant (p>0.05)

**Table (6): - Mean scores of procedural properties among children in the study and control groups.**

Items	Study group (n=40)	Control group (n=40)	Independent t- test	P-value
Duration of sedation (minutes)	11.00 ± 2.53	14.02 ± 3.50	-4.425 <sup>HS</sup>	.000
Duration of endoscopy (minutes)	9.00 ± 1.51	10.72 ± 1.50	-5.107 <sup>HS</sup>	.000
Duration of recovery (minutes)	10.50 ± 3.44	13.10 ± 4.00	-3.075 <sup>S</sup>	.003

Note: (HS): High significant (p<.001) S: Significant (p<0.05)

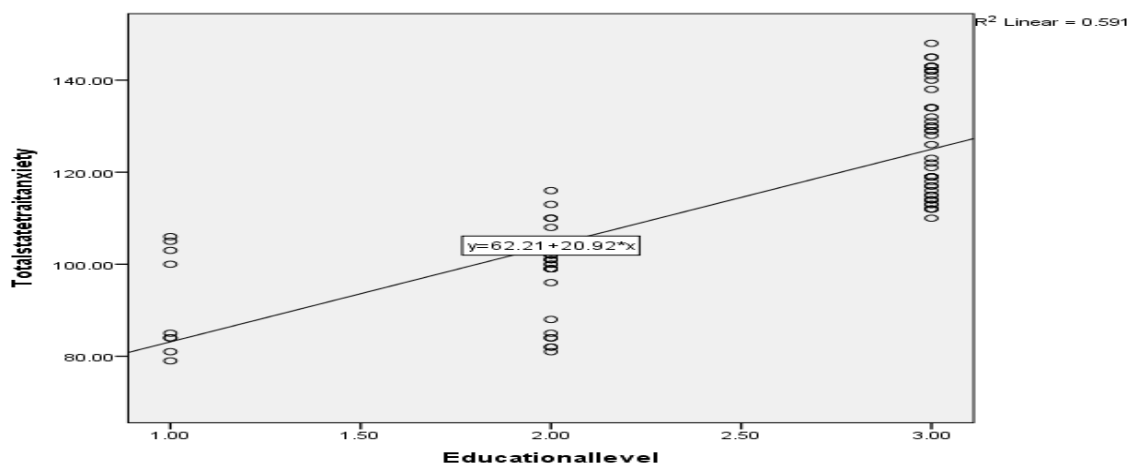
**Table (7): - Pearson correlation between total state trait anxiety and sociodemographic characteristics of studied parents in the study and control groups.**

	Total state trait anxiety			
	Study group (n=40)		Control group (n=40)	
	r	P-value	r	P-value
Gender	.626**	.000	.584**	.000
Number of children	-.850**	.000	-.440*	.005
Receiving anesthesia before	.775**	.000	.692**	.000

NB: \* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed)

**Figure (4): - Pearson correlation between total state trait anxiety and educational level of studied parents among the study and control groups.**



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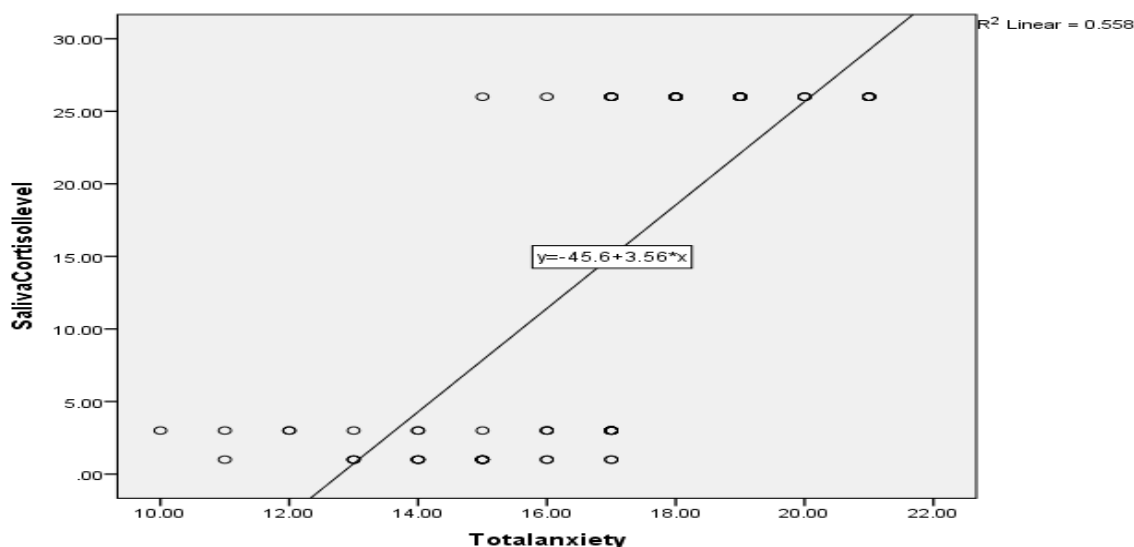
**Table (8): - Pearson correlation between total anxiety and age and gender of children in the study and control groups.**

	Total anxiety			
	Study group (n=40)		Control group (n=40)	
	r	P-value	r	P-value
<b>Age</b>	-.770**	.000	-.487*	.001
<b>Gender</b>	.829**	.000	.804**	.000

**NB:** \* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed)

**Figure (5): - Pearson correlation between total anxiety and Saliva-Cortisol levels of children in the study and control groups on pre and post intervention.**



**Discussion**

The frequency of endoscopies has significantly risen and endoscopy is now a powerful widespread diagnostic and therapeutic procedure in pediatrics’ gastroenterologists. However, these procedures were shown to be a significant source of anxiety and distress for pediatric patients (Johnston, 2022). Pediatric patients and their parents are more concerned with the endoscopic procedure than with the illness itself. These concerns and stressors may stem from apprehension about the procedure as well as a lack of understanding or

misinformation. To overcome this stressor and distress on future, it was urged that children and their parents should be properly informed and prepared for endoscopy procedure. (Cadranel et al., 2021). Video-based learning strategy is non-pharmacological current approach that used for raising awareness, reducing anxiety through illustrated material have shown to prepare children and their parents to face their fear and anxiety (Ozkan et al., 2021).

**Concerning hypothesis one,** this study showed a substantial decrease in

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total parental state and trait anxiety following receiving the video- based learning strategy than on pre intervention in the study group. This finding was in the same line with Hagiwara et al., (2015) and Cam (2020) who showed that the anxiety felt by parents before to GI endoscopy can be lowered further by providing graphic representations that address their concerns. When parents were given a thorough explanation of an endoscopic procedure, the procedural stress was dramatically reduced. This result could be related to details which explained through the video-based learning strategy about pre, during and post endoscopy procedure, which significantly reduced their state and trait anxiety post intervention in the study group than the control group.

Beside that in 2019, Eman and her colleges conducted a study in Egypt to reduce the level of anxiety in children undergoing endoscopy using a psychological preparation program (including introducing children to endoscopic devices and equipment, as well as using illustrated images of endoscopic procedures). The results showed marked decrease in the anxiety level in the intervention group, compared to the control group. All of these findings were consistent with our study results. In the same context, Çelikol et al., (2019) reported that a highly significant difference was discovered between the study group before and after program implementation, as well as between the study group and the control group, regarding the anxiety state and trait mean score.

This finding was consistent with Köse & Arkan, (2020), who discovered in their study in Turkey that employing cartoon assisted endoscopy preparation package reduced children's fear and trait anxiety levels in their parents after interventions. This outcome was also in line with (Hasasn et al., 2022) who found that teaching and reading materials, even those including only the most basic of information, are effective in educating and informing parents about the perioperative care of their children.

**Regarding hypothesis two**, the present investigation demonstrated that there was a significant increase of Saliva- Cortisol levels among children in the study and control groups on pre intervention than on post intervention. This finding could be attributed to being more anxious about the endoscopic procedure. Anxiety lead to more discomfort and manifested by increase of Saliva- Cortisol levels. Also, there was a considerable reduction of Saliva- Cortisol levels among children in the study group on post intervention with video-based learning than on pre intervention. This could be attributed to the video-based learning which reduced children's anxiety which reflected on decreasing Saliva- Cortisol levels. This finding was in same line with Volkan et al. 2019 who conducted a study to examine the impact of basic endoscopic education on children's fear and decreased levels of salivary cortisol. The outcomes showed that following endoscopy, the intervention group's anxiety score and cortisol level dramatically decreased.



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Also, Cam (2021) and (Hasasn et al., 2022) revealed that majority of the investigated children and their parents who got an explanation about the process before endoscopy had a lower pain score and reduced cortisol levels than the control group. According to prior research, the majority of the control group, which did not get preparatory information, had greater levels of cortisol before and after the endoscopy than the study group, which received a comprehensive illustrated preparatory explanation regarding the process.

**Regarding hypothesis three**, the results of the current study highlighted that children in the study group had shorter duration of sedation, endoscopy and recovery than children in the control group. Consistent with our findings, Volkan et al., (2019) who emphasized that when endoscopy-related stress is decreased, the duration of all procedure stages, as well as sedation dose, decreases significantly.

In our study, we discovered that when an endoscopic procedure is described thoroughly to children aged 6 to 18 years old and their parents using a designed video-based learning technique, procedural stress, as measured by cortisol levels and an anxiety questionnaire, is considerably reduced. Furthermore, when endoscopy-related stress is reduced, the length of sedation, endoscopy, and recovery, as well as the amount of sedation provided, are all significantly reduced.

**Conclusion:**

According to the findings of this study, the designed video-based learning technique was effective in reducing endoscopy-related anxiety in children and their parents. Furthermore, when children's endoscopy-related stress is minimized, the time of all stages of the process is greatly shortened.

**Recommendations:**

Based on the findings of the study, the following recommendations can be made:

- 1) Nurses working in endoscopy units should get ongoing health education about how to prepare children for endoscopic procedures.
- 2) In all endoscopy units, Children should be provided strategies to help them feel less anxious before to their endoscopy.
- 3) More research is needed to determine the efficacy of various methods for reducing anxiety in kids having endoscopies.
- 4) More research with a larger sample size is required to identify age-appropriate, standardized preparatory techniques for kids having endoscopies.

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