

# Effect of Preoperative Audiovisual Information on Perioperative Anxiety in Children: A Randomized Controlled Trial

## Çocuklarda Ameliyat Öncesi Görsel-İşitsel Bilgilendirmenin Perioperatif Kaygı Üzerine Etkisi: Randomize Kontrollü Bir Çalışma

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### ABSTRACT

**Objective:** Preoperative anxiety is a prevalent concern among pediatric patients undergoing surgery, often resulting in adverse psychological and physiological outcomes. Audiovisual interventions have demonstrated considerable potential in alleviating anxiety and enhancing perioperative experiences.

**Methods:** This randomized controlled trial included 84 children aged 3–8 years scheduled for elective day surgery. Participants were divided into two groups: the control group (no audiovisual intervention) and the video group (informative animation about anesthesia). Preoperative and postoperative anxiety levels, anesthesia mask compliance, and parental satisfaction were assessed using validated scales.

**Results:** The video group demonstrated significantly lower preoperative anxiety scores, improved compliance during anesthesia induction, and higher parental satisfaction compared with the control group ( $p<0.05$ ). However, no significant differences were observed between the groups regarding postoperative recovery, agitation, or pain scores.

**Conclusion:** Preoperative audiovisual education is an effective, non-invasive method to reduce anxiety and enhance parental satisfaction in pediatric patients undergoing surgery. Further research is needed to explore its long-term psychological effects and integration into routine clinical practice.

**Keywords:** Pediatric anesthesia, sedation, preoperative information

### ÖZ

**Amaç:** Preoperatif anksiyete, cerrahi geçiren pediatrik hastalar arasında yaygın bir sorundur ve sıklıkla olumsuz psikolojik ve fizyolojik sonuçlara yol açabilir. Görsel-ışitsel müdahaleler, anksiyetenin hafifletilmesi ve perioperatif deneyimlerin iyileştirilmesi konusunda önemli bir potansiyel göstermektedir.

**Yöntem:** Bu randomize kontrollü çalışmada, elektif gününbirlik cerrahi planlanan 3-8 yaş arası 84 çocuk yer aldı. Katılımcılar iki gruba ayrıldı: kontrol grubu (görsel-ışitsel müdahale yapılmadı) ve video grubu (anestezi hakkında bilgilendirici animasyon izletildi). Preoperatif ve postoperatif anksiyete düzeyleri, anestezi maskesi uyumu ve ebeveyn memnuniyeti geçerli ölçekler kullanılarak değerlendirildi.

**Bulgular:** Video grubunda, kontrol grubuna kıyasla anlamlı derecede daha düşük preoperatif anksiyete skorları, anestezi induksiyonu sırasında daha iyi uyum ve daha yüksek ebeveyn memnuniyeti gözlemlendi ( $p<0,05$ ). Ancak, gruplar arasında postoperatif iyileşme, ajitasyon veya ağrı skorları açısından anlamlı bir fark bulunmadı.

**Sonuç:** Preoperatif görsel-ışitsel eğitim, cerrahi geçiren pediatrik hastalarda anksiyeteyi azaltmak ve ebeveyn memnuniyetini artırmak için etkili ve invazif olmayan bir yöntemdir. Uzun vadeli psikolojik etkilerini ve rutin klinik uygulamalara entegrasyonunu araştırmak için daha fazla çalışmaya ihtiyaç vardır.

**Anahtar sözcükler:** Pediatrik anestezi, sedasyon, preoperatif bilgilendirme

### INTRODUCTION

Children undergoing surgery often experience significant anxiety shaped by their age, developmental level, and prior medical experiences. Unlike adults, whose fears commonly revolve around mortality, children tend to fear pain and separation from their parents (1). Preoperative anxiety is reported

in up to 60% of pediatric patients and can result in adverse psychological effects, such as sleep disturbances, clinginess, and long-term healthcare-related phobias (2).

To mitigate such anxiety, several preparation methods have been explored, including brochures, videos, therapeutic play, and hospital tours. Among these, audiovisual interventions

Received/Geliş tarihi : 11.02.2025  
Accepted/Kabul tarihi : 03.07.2025  
Publication date : 30.07.2025

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**Cite as:** Celik G, Balcı C. Effect of preoperative audiovisual information on perioperative anxiety in children: A randomized controlled trial. JARSS 2025;33(3):178-183.



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have emerged as low-cost and widely accessible tools, showing effectiveness in decreasing anxiety for both children and parents (3).

However, the content, delivery method, and age-appropriateness of such interventions vary widely across studies. Most previous research has focused on distraction-based audiovisuals (e.g., cartoons or games), whereas informative animated videos designed to educate children about anesthesia have received less study (4).

Therefore, this study aimed to assess the impact of an age-appropriate, informative animated video on preoperative anxiety, cooperation during anesthesia induction, and parental satisfaction in children undergoing elective day surgery.

## MATERIAL and METHODS

This randomized controlled trial was conducted at Kocaeli Provincial Health Directorate Derince State Hospital between March 15 and September 15, 2017. The study was approved by the local Ethics Committee (Approval No: KÜ GOKAEK 2017/44), and written informed consent was obtained from all parents or legal guardians of participating children. Additionally, verbal assent was obtained from children in an age-appropriate manner.

The age range of 3 to 8 years was selected to encompass both preschool and early school-age children who commonly undergo elective surgery at our institution. This allowed for broader applicability while ensuring the developmental appropriateness of the intervention.

Inclusion criteria were as follows: children aged 3 to 8 years, classified as ASA physical status I or II and scheduled for elective day surgery. Exclusion criteria included ASA  $\geq$  III, emergency or repeated surgeries, chronic diseases, developmental disorders, recent anxiety-related complaints, known drug allergies (midazolam, propofol, fentanyl, sevoflurane), or inability to cooperate.

Participants were randomly allocated to either the control or video group using a simple alternation method based on the order of presentation at the outpatient anesthesia clinic. Children admitted on even-numbered calendar days were assigned to the video group, and those on odd-numbered days were assigned to the control group. Due to the nature of the intervention, participants and providers were not blinded; however, the outcome assessor remained blinded to group assignments.

The video group watched an age-appropriate, 10-minute animated video that explained the anesthesia process, surgical preparation, and mask induction using child-friendly language and visuals. The video was shown once during the preoperative clinic visit, approximately 1 to 2 hours prior to surgery. No audiovisual intervention was provided to the control group.

All children received intravenous midazolam at a dose of 0.05 mg kg<sup>-1</sup> for premedication, in line with our institutional pediatric anesthesia protocol. Although midazolam has known risks of postoperative agitation and delirium, it was administered equally in both groups to ensure consistency and procedural standardization. Induction was performed with 2–3 mg kg<sup>-1</sup> of propofol and 1–2 µg kg<sup>-1</sup> of fentanyl, followed by laryngeal mask airway insertion. Anesthesia maintenance was achieved with 2% sevoflurane in a mixture of oxygen and nitrous oxide.

Preoperative anxiety was evaluated using the Modified Yale Preoperative Anxiety Scale (mYPASS), assessing five domains (activity, vocalization, emotional expressiveness, alertness, and interaction with family).

Separation anxiety was assessed during transfer to the operating room using the Parental Separation Anxiety Scale.

Compliance during induction was scored using the Compliance with the Anesthesia Mask Scale. Postoperative recovery was monitored using the Modified Aldrete Score at 5, 10, and 30 minutes after surgery.

Emergence agitation and pain were evaluated using the Urgent Agitation Scale and Visual Analog Scale, respectively, during the post anesthesia care unit stay.

Parental satisfaction was measured through a structured interview at the time of discharge.

A power analysis was conducted prior to enrollment. Based on previous data, a difference of 3 points in mYPASS total scores was considered clinically significant. Assuming a standard deviation of 4.5, a sample size of 42 patients per group was required to detect this difference with 80% power at a 5% significance level (5).

## Statistical Analysis

Data were analyzed using SPSS 20.0 (IBM Corp., Armonk, NY). Continuous variables were presented as mean  $\pm$  standard deviation or median (IQR), and categorical variables as counts and percentages. Student's t-test or Mann–Whitney U test was used for continuous variables, and chi-square or Fisher's exact test for categorical variables. A p-value  $<0.05$  was considered statistically significant.

## RESULTS

A total of 95 children were assessed for eligibility, and 84 participants were enrolled and completed the study. The CONSORT flow diagram illustrating enrollment and group allocation is presented in Figure 1. Participants were evenly distributed between the control group (n=42) and the video group (n=42).

There were no statistically significant differences between the groups in terms of age, gender, body mass index (BMI), ASA classification, or surgery duration (Table I). The mean age of the participants was  $5.76 \pm 1.79$  years, and the majority were male (92.9%). Most children were classified as ASA I (91.7%).

As shown in Table II, the most common surgical procedure in both groups was circumcision. Other procedures included hydrocelectomy, hypospadias surgery, orchiopexy, and inguinal hernia repair, with no statistically significant differences in distribution between groups.

The total mYPASS score was significantly lower in the video group compared to the control group ( $12.74 \pm 3.75$  vs.  $17.07 \pm 4.70$ ;  $p < 0.001$ ). All individual domains of mYPASS (activity, vocalization, emotional state, alertness, and family interaction) showed significantly lower scores in the video group ( $p < 0.01$  for all; Table III).

Similarly, the Parental Separation Anxiety scores were significantly reduced in the video group ( $1.42 \pm 0.83$ ) compared to the control group ( $2.14 \pm 1.03$ ;  $p < 0.001$ ).

Children in the video group demonstrated better cooperation during mask induction, as indicated by lower compliance scores ( $1.60 \pm 0.83$  vs.  $1.97 \pm 0.95$ ;  $p = 0.032$ ).

There were no statistically significant differences between the groups in terms of Modified Aldrete Recovery Scores at 5, 10, and 30 minutes postoperatively.

Similarly, postoperative agitation levels, as measured by the Urgent Agitation Scale, and pain scores, as measured by the VAS, did not differ significantly between the two groups (Table III).

Parental satisfaction was significantly higher in the video group compared to the control group ( $3.71 \pm 0.60$  vs.  $2.97 \pm 0.90$ ;  $p < 0.001$ ).

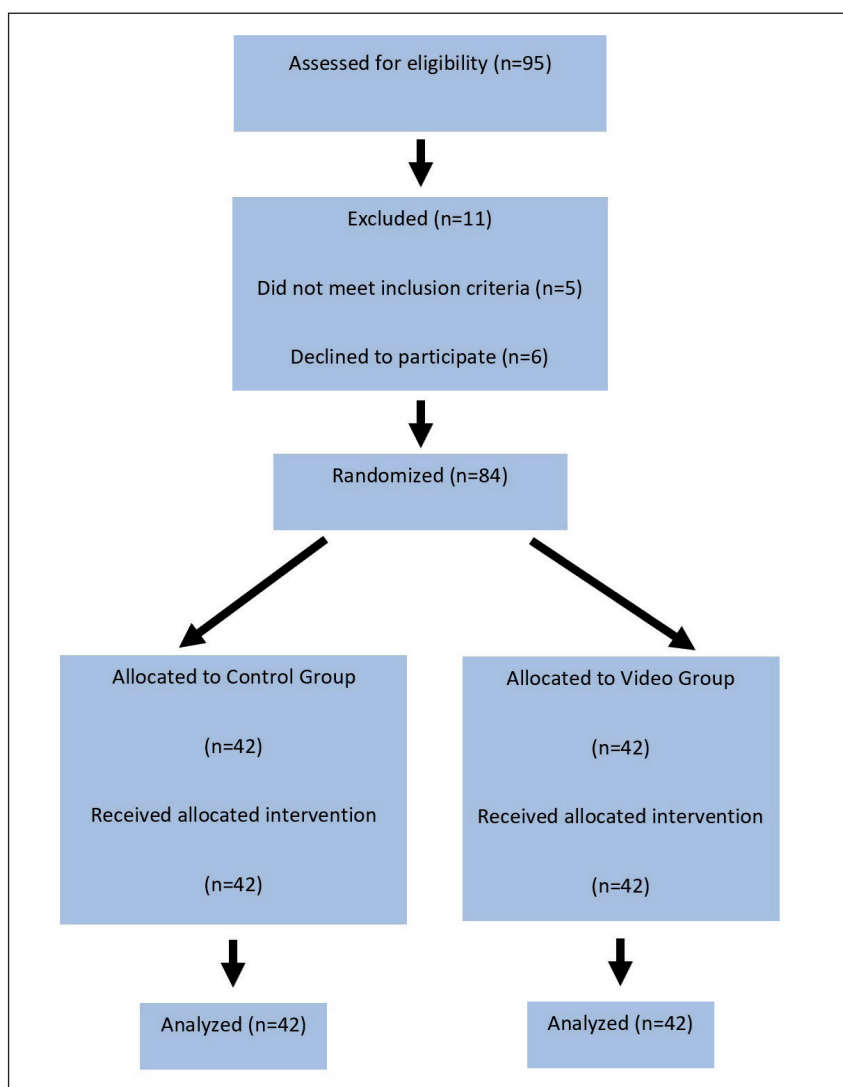


Figure 1. Flow diagram.

**Table I.** Demographic Data and Comparison of Patients

Parameter	Control Group (n=42) Mean $\pm$ SD	Video Group (n=42) Mean $\pm$ SD	p-value
Age (years)	5.83 $\pm$ 1.89	5.69 $\pm$ 1.72	0.72
Gender (M/F)	41/1	37/5	0.20
BMI (kg m <sup>-2</sup> )	15.82 $\pm$ 1.37	15.83 $\pm$ 1.07	0.64
ASA (I/II)	39/3	38/4	1.00
Surgery Duration (min)	38.83 $\pm$ 20.26	40.98 $\pm$ 16.84	0.39

n: Sample size, **Mean  $\pm$  SD:** Mean  $\pm$  Standard Deviation, **p-value:** Probability value, **M/F:** Male/female, **BMI:** Body Mass Index, **kg:** kilogram, **m<sup>2</sup>:** Square meter, **ASA:** American Society of Anesthesiologists, **min:** Minute.

**Table II.** Distribution and Comparison of the Surgical Procedures of the Patients

Surgery	Control Group (n=42) Mean $\pm$ SD	Video Group (n=42) Mean $\pm$ SD	p-value
Circumcision surgery	29 (69.0%)	23 (54.8%)	0.26
Hydrocelectomy	5 (11.9%)	3 (7.1%)	0.71
Hypospadias surgery	1 (2.4%)	2 (4.8%)	1.00
Orchiopexy	2 (4.8%)	1 (2.4%)	1.00
Inguinal hernia surgery	0	5 (11.9%)	0.06
Other surgeries	5 (11.9%)	8 (19.0%)	0.55

n: sample size, **Mean  $\pm$  SD:** Mean  $\pm$  Standard Deviation, **p-value:** Probability value.

**Table III.** Modified Yale Preoperative Anxiety Scale, Parental Separation Anxiety Scale, Compliance with the Anesthesia Mask Scale, PACU Urgent Agitation Scale, Visual Analog Scale, Parental Satisfaction Values, and a Comparison Between Groups

	Control Group (n=42) Mean $\pm$ SD	Video Group (n=42) Mean $\pm$ SD	p-value
mYPASS—Activity	3.05 $\pm$ 0.91	2.31 $\pm$ 0.95	0.000*
mYPASS—Vocalizations	4.19 $\pm$ 1.61	3.10 $\pm$ 1.56	0.002*
mYPASS—Emotional State	3.19 $\pm$ 0.97	2.40 $\pm$ 0.96	0.000*
mYPASS—Alertness	3.24 $\pm$ 0.91	2.31 $\pm$ 0.84	0.000*
mYPASS—Family Use	3.38 $\pm$ 0.94	2.60 $\pm$ 0.96	0.000*
mYPASS—Total score	17.07 $\pm$ 4.70	12.74 $\pm$ 3.75	0.000*
Separation	2.14 $\pm$ 1.03	1.42 $\pm$ 0.83	0.000*
Induction	1.97 $\pm$ 0.95	1.60 $\pm$ 0.83	0.032*
PACU Urgent Agitation Scale			
5 <sup>th</sup> minute	2.14 $\pm$ 0.68	1.95 $\pm$ 0.76	0.17
10 <sup>th</sup> minute	2.02 $\pm$ 0.75	1.76 $\pm$ 0.73	0.09
30 <sup>th</sup> minute	1.81 $\pm$ 0.74	1.62 $\pm$ 0.58	0.28
Visual Analog Scale			
5 <sup>th</sup> minute	2.38 $\pm$ 1.01	2.43 $\pm$ 1.06	0.97
10 <sup>th</sup> minute	2.26 $\pm$ 0.94	1.90 $\pm$ 0.96	0.08
30 <sup>th</sup> minute	2.05 $\pm$ 0.91	1.88 $\pm$ 1.02	0.30
Parent Satisfaction	2.97 $\pm$ 0.90	3.71 $\pm$ 0.60	0.000*

n: Sample size, **Mean  $\pm$  SD:** Mean  $\pm$  Standard Deviation, **p-value:** Probability value, **mYPASS:** Modified Yale Preoperative Anxiety Scale, **PACU:** Post anesthesia care unit, \*p<0.05 was considered significant.

## DISCUSSION

This study demonstrated that an age-appropriate, informative animated video significantly reduced preoperative anxiety, improved compliance during mask induction, and increased parental satisfaction among children undergoing elective surgery. Although postoperative recovery parameters, pain, and emergence agitation did not differ significantly between groups, the intervention enhanced the perioperative experience for both patients and caregivers.

Our findings are consistent with a growing body of evidence supporting the efficacy of audiovisual interventions in reducing perioperative anxiety in pediatric patients (6,7). A 2024 meta-analysis, including 45 studies, confirmed that video-based distractions—especially animated cartoons and educational videos—yield the most significant reduction in children’s anxiety compared to no intervention or standard verbal explanations (8). Furthermore, a 2025 systematic review concluded that even video games may outperform oral midazolam in reducing anxiety and improving postoperative behavior without sedative-related side effects (9). These data affirm the growing role of non-pharmacological strategies in routine pediatric anesthetic practice.

Significantly, our study adds to a more focused line of research examining the impact of informative—rather than purely entertaining—video content. A recent randomized controlled trial comparing an educational animation to a passive cartoon found that the educational video resulted in lower postoperative anxiety and pain scores, supporting the idea that cognitive engagement through procedural education may offer additional benefits (10). In our trial, the animation explained the anesthetic and surgical process in child-friendly language, aiming to reduce fear through familiarity. This approach appears to bridge the gap between emotional distraction and cognitive preparation.

Moreover, this structured audiovisual intervention improved parental satisfaction, an outcome frequently overlooked in similar studies. This finding aligns with results from a 2024 randomized controlled trial using virtual reality tours of the operating room, where parents of children who received immersive audiovisual education reported significantly greater satisfaction with the perioperative experience (11). Taken together, these findings suggest that audiovisual preparation may have a positive impact not only on the child but also on the broader family dynamic during the surgical process.

To our knowledge, this is among the first randomized controlled studies in Türkiye focusing specifically on a single-session,

developmentally appropriate educational animation. Its low cost, brief duration, and standardizable format make it feasible for integration into various clinical settings, especially in institutions where pharmacological sedation is either undesired or unavailable. While previous studies have explored video-based distractions and virtual reality, few have evaluated educational tools designed explicitly to enhance understanding and cooperation in preschool-aged children.

Despite its strengths, this study has limitations. It was conducted in a single center with a relatively small sample size and lacked long-term follow-up to evaluate the persistence of psychological effects. Additionally, although surgical types were evenly distributed, their heterogeneity could have introduced variability in postoperative outcomes. Future studies should examine the role of audiovisual education in children with high trait anxiety, those undergoing more invasive procedures, or populations with neurodevelopmental conditions, as suggested by recent trials (12).

In conclusion, informative audiovisual education appears to be an effective, non-invasive, and scalable strategy to reduce preoperative anxiety and improve parental satisfaction in pediatric surgical settings. By providing both emotional reassurance and procedural understanding, such tools offer a holistic, child- and family-centered approach to perioperative care.

## CONCLUSION

This randomized controlled trial demonstrated that an informative animated video significantly reduced preoperative anxiety, improved cooperation during mask induction, and enhanced parental satisfaction in pediatric patients undergoing elective surgery.

The intervention was brief, low-cost, and non-invasive, yet it yielded clinically meaningful improvements in the perioperative experience. Unlike passive distractions, our educational video provided procedural understanding, contributing not only to reduced fear but also to increased engagement and trust from both children and caregivers.

Although no significant differences were found in postoperative agitation or pain, the positive effects on anxiety and satisfaction support the integration of such audiovisual tools into standard pediatric preoperative care.

Future multicenter studies with larger samples and long-term follow-up are warranted to evaluate the durability of these benefits and to assess their applicability in children with heightened anxiety traits or special healthcare needs.

### AUTHOR CONTRIBUTIONS

**Conception or design of the work:** GC, CB

**Data collection:** GC

**Data analysis and interpretation:** GC

**Drafting the article:** GC

**Critical revision of the article:** CB

The author (GC, CB) reviewed the results and approved the final version of the manuscript.

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