

ORIGINAL INVESTIGATION

The Effect of Flexible Bronchoscopy on Anxiety in Children

Ahmet Türkeli¹, Özge Yılmaz², İsmet Topçu³, Hasan Yüksel²

¹Department of Pediatric Immunology and Allergy, Eskişehir State Hospital, Eskişehir, Turkey

²Department of Pediatric Allergy and Respiratory, Celal Bayar University Faculty of Medicine, Manisa, Turkey

³Department of Anesthesiology and Reanimation, Celal Bayar University Faculty of Medicine, Manisa, Turkey

Abstract

OBJECTIVES: Flexible bronchoscopy (FB) is a semi-invasive diagnostic tool that allows direct visualization of the airways. The use for diagnostic and therapeutic purposes in children is increasing with the developments in modern anesthesia. Irrespective of the type of the invasive diagnostic procedure, these interventions are known to cause anxiety in patients. The aim of our study was to evaluate the anxiety and depression status in children hospitalized for bronchoscopy and to investigate the effects of FB.

MATERIAL AND METHODS: Thirty children hospitalized for FB and 30 controls, aged 7 to 16 years, were enrolled in this study. Anxiety was evaluated with the "Hospital anxiety and depression scale" (HADS) besides other parameters recorded.

RESULTS: The mean HADS anxiety scores in the patient and control groups were respectively 10.1 (3.5) and 2.7 (1.3) ($p=0.001$). The mean HADS depression scores were respectively 8.8 (3.7) and 2.2 (1.1) ($p=0.001$). Among the patients, 50% had anxiety and 53.3% had findings while none in the control group showed signs of anxiety and depression. A positive correlation was found between the age and, anxiety and depression scores in patients' groups (respectively $r_1=0.257$; $p=0.05$ and $r_2=0.288$; $p=0.02$).

CONCLUSION: Anxiety was demonstrated in nearly half of the children hospitalized for bronchoscopy. It has been observed that behavioral and physical problems may be encountered in approximately 40-60% of children who feel generalized anxiety before anesthesia, during the preoperative, postoperative period, and subsequent periods. These results suggest that the detection of children with increased anxiety and indicate the individual requirements can be assisted pharmacological and psychological supports.

KEYWORDS: Flexible bronchoscopy, children, anxiety

Received: 11.11.2015

Accepted: 12.02.2015

INTRODUCTION

Pediatric flexible bronchoscopy (PFB) is a diagnostic tool enabling direct visualization of the nose, pharynx, larynx, and the tracheobronchial tree [1]. From 1978, when Wood et al. first used PFB, onwards, its indications, application methods, diagnostic use, and the safety of the procedure have been defined, and flexible bronchoscopy (FB) became a popular tool in evaluating the airways of pediatric patients. FB is performed under general anesthesia in the operating room with a team made up of a bronchoscopy specialist, an assistant physician, a bronchoscopy nurse and an anesthesiologist for diagnostic or therapeutic purposes or in order to obtain secretion or cells from the lungs. With the improvement in modern anesthesiology techniques, younger and sicker children are evaluated more safely when compared to the past [1,2].

Whatever the type of interventional diagnostic methods is, it is known that the decision of an interventional procedure creates anxiety on the individual [3]. Due to the fact that children have limited cognitive development, limited understanding of their diseases, and poor strategies to deal with the diseases, they are fragile against hospitalization [4]. The first step to be taken in competing with anxiety is to detect it with valid and clinically-evaluable instruments. It will be easier to help the patient and his/her relatives once these factors are detected [4]. Hospital Anxiety and Depression (HAD) scale is a scale designed to determine the levels of anxiety of the patients and to make the patient discover how he/she feels about him/herself [5].

The aim of this study was to evaluate the anxiety and depression levels of pediatric patients admitted to hospital for bronchoscopy by carrying out the HAD scale and assess the effects of FB on the level of anxiety. Children with elevated levels of anxiety would be detected, and pharmacologic and psychologic support systems oriented at their individual needs would be recognized.



Address for Correspondence: Hasan Yüksel, Celal Bayar Üniversitesi Tıp Fakültesi, Çocuk Allerji ve Solunum Bilim Dalı, Manisa, Türkiye

Phone: +90 532 548 7032 E-mail: hyukselefe@hotmail.com

©Copyright 2016 by Turkish Thoracic Society - Available online at www.turkishthoracicjournal.com

MATERIALS AND METHODS

Thirty pediatric patients between the ages of 7 and 16, who were admitted to hospital for bronchoscopy, were included into this case control study. The control group comprised thirty healthy pediatric patients who applied to the pediatric polyclinic and did not have any acute or chronic diseases and on whom no interventional procedure was performed.

Study Design

The children on whom bronchoscopy was to be performed were admitted to hospital one day prior to the operation for preoperative preparations. The sociodemographic characteristics, height and weight of the patients were recorded. After having obtained family consent, the HAD scale was filled out by the children themselves without having being informed about the FB procedure since it affects the scoring of the HAD scale. The diagnoses of the patients prior to bronchoscopy were recorded. Afterwards, the children on whom FB was to be performed and their parents were informed about the reason of the procedure, how the procedure would be performed, and the reliability and possible complications of the procedure verbally or by drawing pictures to the extent of their cognitive levels, and then, informed consent forms were taken from the families. After having recorded the sociodemographic characteristics, height and weight of the patients in the control group and having received informed consent forms from their families, the HAD scale was filled out by these children themselves.

With the purpose of premedication, the children on whom flexible bronchoscopy was to be performed were given 2% lidocaine solution using an age appropriate mask by means of nebulisator and 0.5 mg/kg/dose midazolam intranasally for sedation one hour prior to the procedure in order to obtain local anesthesia. The time between premedication and the start of the FB procedure was recorded. FB procedure was performed under general anesthesia given through a mask. Pediatric flexible bronchoscope (Olympus BF3C20, Japan) with an outer diameter of 3.6 to 4.9 mm and an operation channel diameter of 1.2 to 2.2 mm was used in the FB procedure. Respiratory frequency, PaO₂, EtCO₂, and heart rate were recorded at the start and at the fifth, tenth, fifteenth, thirtieth, and forty-fifth minutes of the FB procedure. Specimens were taken with bronchoalveolar lavage from all cases for cytological analysis. Direct microscopic evaluation, Lowenstein-Jensen culture and polymerase chain reaction analyses were performed on the specimens taken for microbiologic evaluation for tuberculosis bacillus. The time between intra-FB and the post-bronchoscopic period until children regain consciousness in the recovery room and the complications that arose were recorded. The diagnoses made as a result of the data obtained pre and post-bronchoscopy were also recorded.

Hospital Anxiety and Depression Scale

Hospital anxiety and depression scale was developed by Zigmond and Snaith to determine the risk of anxiety and depression in patients and to measure its level and change

in severity. It was designed to scan mood disorders in a medically diseased population. It is a scale used frequently in hospital settings, which scans the signs of anxiety and depression and which is filled out by the patient himself. In order to differentiate between psychiatric and physical signs, the scale emphasizes subjective destruction rather than physical signs. Depression subscale considers anhedonia instead of sadness as the basic symptom [6]. The scale is comprised of a total of fourteen questions, and seven (odd numbers) measure anxiety and the other seven (even numbers) measure depression. The cut points of the Turkish version of the HAD scale was found 10 for the anxiety subscale and 7 for the depression subscale. 7-item depression subscale is scored between 0 to 21 and a cut point of 0-7= Normal, a cut point of 8-10= Mild, a cut point of 11-14= Medium, and a cut point of 15-21= Severe mood disorder.

Ethics Committee

This is a case control study which was evaluated and approved by the Ethics Committee of Celal Bayar University.

Statistical Analysis

Statistical analysis of the study was performed using SPSS 15.0 (Chicago IL) computer program, and $p < 0.05$ was considered as statistically significant. Student's t-test was used to compare the age, height, weight, and anxiety and depression scores between the patient and the control groups. Gender distribution between the groups was assessed by Pearson's Chi-square test. Pearson's correlation test was used in the correlation of the anxiety and depression scores with age.

RESULTS

The study included thirty patients on whom bronchoscopy was performed and thirty controls. The patient group included 12 (40%) male and 18 (60%) female patients while the control group included 14 (46.7%) male and 16 (53.3%) patients ($p = 0.79$) (Table 1). Mean age of the sick children was 10.9 (3.3) years and mean age of the control group was 10.2 (2.3) years ($p = 0.38$) (Table 1).

HAD scale anxiety scores were found respectively as 10.1 (3.5) and 2.7 (1.3) in the patient and control groups (Figure 1). HAD scale depression scores were found respectively as 8.8 (3.7) and 2.2 (1.1) in the patient and control groups (Figure 1). While anxiety signs were detected in 50% and

Table 1. Sociodemographic characteristics of the children included into the study

	Bronchoscopy group (n= 30)	Control group (n= 30)
Age	10.9 (3.3)	10.2 (2.3)
Height (cm)	134.2 (23.9)	132.2 (15.9)
Weight (kg)	32.4 (13.6)	31.8 (11.2)
Gender		
Male	12 (40.0)	14 (46.7)
Female	18 (60.0)	16 (53.3)

* Student's t-test.

§ Pearson's Chi-Square [% (n)].

Table 2. Anxiety and depression states of the children included into the study

	Bronchoscopy group (n= 30)	Control group (n= 30)	p*
Anxiety score	10.1 (3.5)	2.7 (1.3)	0.001
Depression score	8.8 (3.7)	2.2 (1.1)	0.001

* Student's t-test.

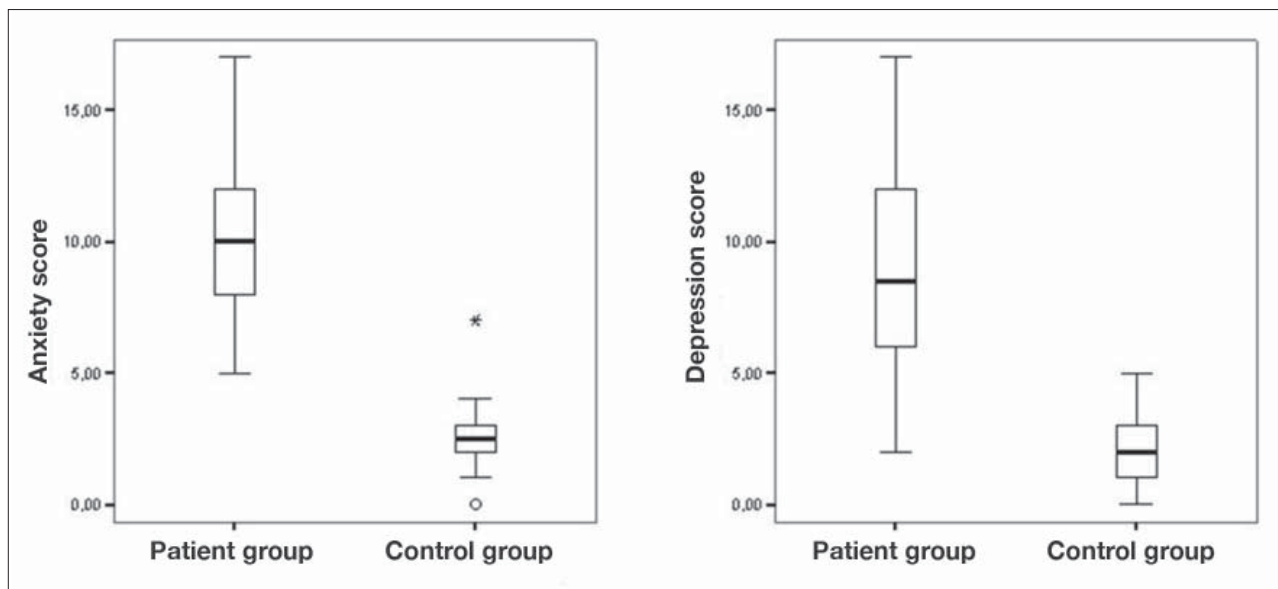


Figure 1. Anxiety and depression scores of the bronchoscopy and control groups.

depression signs in 53.37% of the patients in the patient group, no signs of anxiety and depression were detected in the control group. HAD scale determined a positive correlation between anxiety and depression scores and age ($r_1 = 0.257$; $p = 0.05$ and $r_2 = 0.288$; $p = 0.02$, respectively).

Figure 2 shows the diagnoses of the patients before and after bronchoscopy. The most frequent bronchoscopy indications were tuberculosis, exploration due to hemoptysis, bronchiectasis, and asthma. In patients on whom bronchoscopy was performed, mean premedication time was 52.9 ± 9.4 min, mean bronchoscopy procedure duration was 14.9 ± 10.5 min and mean anesthesia period was 27.2 ± 13.2 min.

As a complication, bronchospasm was seen in three patients in the reanimation period after bronchoscopy and in one patient during anesthesia prior to bronchoscopy.

While bronchiectasis was the most encountered disease in bronchoscopy, it was followed by tuberculosis, outer pressure to the airway and re-fistula diagnoses that developed after operated tracheoesophageal fistula.

DISCUSSION

As a result of this study, it was shown with the HAD scale that anxiety and depression rates were higher in children admitted to hospital for bronchoscopy than the healthy controls.

Bronchoscopy is the procedure with which the upper and lower airways are visualized endoscopically. The pioneers of

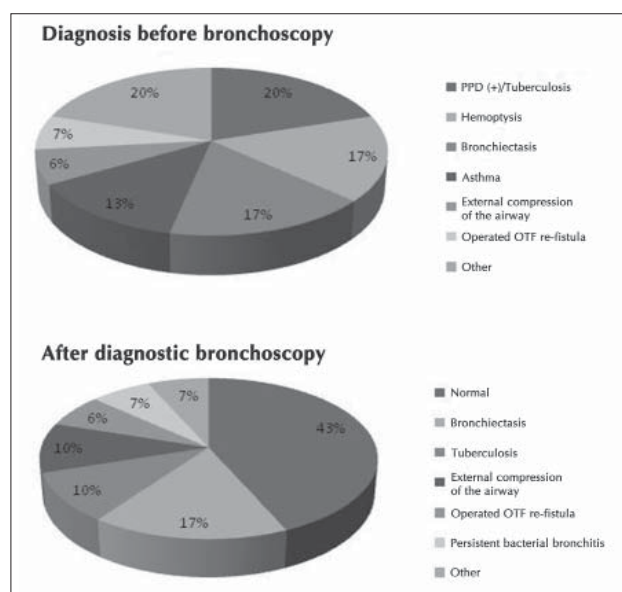


Figure 2. Preliminary diagnoses and post-flexible bronchoscopy diagnoses of the patients.

this procedure were rigid bronchoscopes, which were then followed and advanced by flexible bronchoscopes that have been in use for the last twenty years. Flexible bronchoscopes (FB) are increasingly preferred thanks to their ease of use and scarcity in side effects. If the benefit provided by FB is much more when compared to the risk of the procedure, FB is indicated [2]. While deciding on FB in children, patient history, findings of physical examination and the results of

previous diagnostic tests should be taken into consideration. FB takes an important place in the diagnosis and treatment of pediatric respiratory tract diseases. FB is performed in children in cases like long-lasting chronic cough, recurrent pneumonia, suspicion of foreign object aspiration, and accumulated secretions in the tracheobronchial tree. Whether or not there is a history of foreign object aspiration, diagnostic and therapeutic bronchoscopy should not be avoided in suspected cases [7].

Disease and hospitalization cause anxiety in children [4,8]. In our study, anxiety was detected in 50% of the patients. Anxiety is a normal, intuitive reaction which is developed against a threat or lack of an object and is accompanied by various unpleasant bodily senses [9]. Anxiety progresses with symptoms like edginess, concern, tachycardia, trouble in breathing, zonesthesia, trimmer in hands and feet, and excessive sweating [10]. Anxiety in hospitalized children can develop due to diverse reasons, such as being harmed physically, being operated on, fear of not waking up after anesthesia or dying, loss of control, pain, being isolated, having to leave loved ones, and distancing from social life [3,8,11,12].

The unfamiliarity of the hospital setting, the staff, the necessity to communicate with strangers, the use of medical terms by the healthcare team, the materials used and procedures to be performed are full of obscurities for children of all ages, and it should be noted that these factors have an effect on the children's level of anxiety. The fact that an intervention is to be employed in addition to hospitalization makes the child to get more stressed and affects the child psychologically and physiologically [4,11,13]. FB procedure in children is performed under general anesthesia in the operating room in our department.

It would be wise to be aware of the changing behavioral characteristics of children in different age periods and a connection should be made as regards their perception and comprehension of events. Children at the age of 7 to 11 start to comprehend the reasons of diseases with the help of cognitive maturity [14]. They show their reactions to the physicians and nurses by crying, yelling and even by acting resented. On the other hand, they sometimes withdraw, do not make any contact with the environment and show an excessive calmness. Unless the children are provided with all necessary information regarding the procedure in this period, isolation and feeling of loneliness, which increase preoperative anxiety, are induced [3]. Therefore, explaining the procedure verbally or with pictures to these children in this age group reduces anxiety [15]. The children in the adolescent period (13-18 ages) have the cognitive capability to understand related explanations about bronchoscopy [15]. The adolescent period is when the children accept who they are and are sensitive to the changes in their body images. The sick children in this age group are afraid of losing control and being separated from their peers [13]. In a study carried out on adolescent patients, it has been put forward that the concepts of disease and hospital create major stress, and trouble related to hospitalization in pediatric or adult clinics

is encountered. It has been shown that informing these adolescent patients one week prior to the procedure reduces anxiety [11].

When the literature was reviewed, it was seen that there is no study on bronchoscopy procedure and its effects on anxiety in children. The majority of the studies comprise the ones related to anesthesia and surgical interventions. It has been determined that more than 40-60% of the children undergo anxiety and fear in the preoperative period, especially during anesthesia induction [14,16,17]. Wollins et al. have shown that hospital setting causes anxiety in approximately 38% of the children between the ages of 5-12 undergoing elective surgery and again that a high degree of anxiety is observed in the preoperative period in 53% of these children [18,19]. Similarly, anxiety was observed in 50% of the patients in our study. In a study carried out in adolescents between the ages of 11-18, preoperative anxiety has been detected in more than 80% of these adolescents [20]. The higher rate of anxiety level in this study when compared to the rate found in ours can be explained by the fact that anxiety increases in parallel with age and that the age of this study group is higher than ours [20].

Kain et al. have established in a study carried out in children on whom minor surgery was to be performed that with increasing age, the rate of anxiety also increases in the preoperative period [21]. Similarly, anxiety and depression rates that increase with age were also observed in our study. However, Vagnoli et al. have not observed anxiety and depression rates that increase with age in their study [12]. The reason could originate from the method used or the fact that the study group was small in size.

A series of prevention strategies have been developed to reduce preoperative anxiety incidence in children. Both pharmacologic (like sedatives) and non-pharmacologic (presence of family, behavioral preparation programs, music, acupuncture, and etc) approaches have been proven to be useful [17]. Özen et al. have shown in their study that patient approach and information given before the intervention are effective in reducing anxiety [22]. In a study by Kain et al., it has been shown in children over the age of six that therapeutic games performed 5-7 days prior to surgery and surgery preparation programs involving behavioral methods like the introduction of the hospital and the operating room are effective in reducing anxiety levels in children [23].

Similarly, Cuzzocrea et al. have demonstrated that anxiety is low in children on whom preoperative physiological program is applied in the pediatric surgery clinic [8]. In our study, illuminating explanations regarding FB procedure were given after HAD scale was filled out so as not to affect the results of the HAD scale.

In conclusion, being sick and admitted to hospital affect the lives of children in many ways and increase their concerns and worries. Especially cases, where surgical intervention is needed for the diagnosis or treatment of a disease, bring out psychological problems like the development of high level of anxiety in children. It was shown in our study by the HAD

scale that anxiety was developed in half of the children that would undergo bronchoscopy. Since behavioral and physical problems such as enuresis, nutrition disorders, apathy and sleeping disorders are observed to be seen in more than half of the children that frequently go through anxiety in the period before anesthesia, it would be wise to detect these children with anxiety and provide them with necessary pharmacologic and psychologic support aimed at individual needs.

The limitations of our study could be the fact that psychiatric interviews were not carried out with the patients and that the effect of medical disease severity on anxiety was not looked into.

Author Contributions: Concept - H.Y., Ö.Y., A.T., İ.T.; Design - H.Y., Ö.Y., A.T.; Supervision - H.Y., Ö.Y., A.T., İ.T.; Data Collection and/or Processing - H.Y., Ö.Y., A.T., İ.T.; Analysis and/or Interpretation - Ö.Y., A.T.; Literature Search - A.T., Ö.Y.; Writer - A.T., Ö.Y., H.Y.; Critical Review - H.Y., Ö.Y., A.T.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Midulla F, de Blic J, Barbato A, et al. Flexible endoscopy of paediatric airways. *Eur Respir J* 2003;22:698-708. [\[CrossRef\]](#)
2. Yüksel H, Söğüt A, Topçu İ ve ark. Çocukluk çağında fleksibl fiberoptik bronkoskopi deneyimi: 96 olgunun değerlendirilmesi. *Tur Toraks Der* 2008;9:17-21. [\[CrossRef\]](#)
3. Santos T. Nursing interventions to reduce preoperative anxiety in school-age children: an integrative review. *Revista de Enfermagem Referência* 2014;4:149-55. [\[CrossRef\]](#)
4. Foster RL, Park JH. An integrative review of literature examining psychometric properties of instruments measuring anxiety or fear in hospitalized children. *Pain Manag Nurs* 2012;13:94-106. [\[CrossRef\]](#)
5. Aydemir Ö. Hastane anksiyete ve depresyon ölçeği Türkçe formunun geçerlilik ve güvenilirlik çalışması. *Türk psikiyatri dergisi* 1997;8:280-7. [\[CrossRef\]](#)
6. Kılınc S, Torun F. Baş dönmesi şikayeti olan bireylerde baş dönmesi süreğenliği ile depresyon ilişkisinin incelenmesi. *Dirim Tıp Gazetesi* 2011;86:39-47.
7. Çobanoğlu U, Edirne Y, Akgün C ve ark. Tekrarlayan pnömoni ve öksürük etiyolojisinde yabancı cisim aspirasyonu düşünülen çocuk olguların tanı ve tedavisinde bronkoskopinin değeri. *Tur Toraks Der* 2008;9:146-50. [\[CrossRef\]](#)
8. Cuzzocrea F, Gugliandolo MC, Larcan R, et al. Psychological preoperative program: effects on anxiety and cooperative behaviors. *Paediatr Anaesth* 2013;23:139-43. [\[CrossRef\]](#)
9. Justus R, Wyles D, Wilson J, et al. Preparing children and families for surgery: mount sinai's multidisciplinary perspective. *Pediatric Nursing* 2006;32:35-43. [\[CrossRef\]](#)
10. Messina M, Molinaro F, Meucci D, et al. Preoperative distraction in children: hand-held videogames vs clown therapy. *Pediatr Med Chir* 2014;36:98. [\[CrossRef\]](#)
11. Ünver S, Yıldırım M. Cerrahi girişim sürecinde çocuk hastaya yaklaşım. *Güncel Pediatri* 2013;11:128-33. [\[CrossRef\]](#)
12. Vagnoli L, Caprilli S, Robiglio A, et al. Clown doctors as a treatment for preoperative anxiety in children: a randomized, prospective study. *Pediatrics* 2005;116:e563-7. [\[CrossRef\]](#)
13. Altay NC. Çocuklarda ameliyat öncesi hazırlık. *Sağlık Bilimleri Fakültesi Hemşirelik Dergisi* 2008;68-76. [\[CrossRef\]](#)
14. Litke J, Pikulska A, Wegner T. Management of perioperative stress in children and parents. Part I--the preoperative period. *Anaesthesiol Intensive Ther* 2012;44:165-9. [\[CrossRef\]](#)
15. Kociela VL. Pediatric flexible bronchoscopy under conscious sedation: nursing considerations for preparation and monitoring. *J Pediatr Nurs* 1998;13:343-8. [\[CrossRef\]](#)
16. Çorapçıoğlu A, Aydemir Ö, Yıldız M ve ark. DSM IV Eksen I Bozuklukları (SCID I) için Yapılandırılmış Klinik Görüşme-Klinik Versiyon. Hekimler Birliği Yayınevi, 1999, Ankara.
17. Wright KD, Stewart SH, Finley GA, et al. Prevention and intervention strategies to alleviate preoperative anxiety in children: a critical review. *Behav Modif* 2007;31:52-79. [\[CrossRef\]](#)
18. Wollin SR, Plummer JL, Owen H, et al. Anxiety in children having elective surgery. *J Pediatr Nurs* 2004;19:128-32. [\[CrossRef\]](#)
19. Wollin SR, Plummer JL, Owen H, et al. Predictors of preoperative anxiety in children. *Anaesth Intensive Care* 2003;31:69-74. [\[CrossRef\]](#)
20. Fortier MA, Martin SR, Chorney JM, et al. Preoperative anxiety in adolescents undergoing surgery: a pilot study. *Paediatr Anaesth* 2011;21:969-73. [\[CrossRef\]](#)
21. Kain ZN, Mayes LC, O'Connor TZ, et al. Preoperative anxiety in children. Predictors and outcome. *Arch Pediatr Adolesc Med* 1996;150:1238-45. [\[CrossRef\]](#)
22. Özen A. Ürodinamik girişim uygulanacak hastaların işlem öncesi bilgilendirilmesinin anksiyete düzeylerine etkisi (Tez). Eskişehir: Osmangazi Üniversitesi Sağlık Bilimleri Enstitüsü; 2005. [\[CrossRef\]](#)
23. Kain ZN. Preoperative preparation in children: a cross-sectional study. *J Clin Anesth* 1996;8:508-14. [\[CrossRef\]](#)