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Research Article

Effects of the Specialized Preoperative Waiting Room on Preoperative Anxiety in Pediatric Patients

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Abstract

Preoperative anxiety is a common event-related psychological disorder, which increases the perioperative risk, especially among children. The aim of this study is to establish a specialized waiting room for pediatric patients and investigate the efficiency on preoperative anxiety. This is a single center, open label, randomized controlled trial. Eligible children were randomly allocated into the routine waiting group (control group) and the specialized waiting group (study group). The Children's Emotional Manifestation Scale (CEMS), crying times, separation emotion, the degree of coordination, satisfaction score of parents, and quality of postoperative recovery were collected and analyzed. A total of 150 children were included and analyzed. Patients in the study group had lower CEMS score, less crying times, better separation emotion and coordination degree, and better recovery quality on the 1st postoperative day than those in the control group (p<0.05). However, the recovery quality on the 3rd or 7th postoperative day was comparable between the groups (p>0.05). Besides, the guardians in the study group gave higher scores to the preoperative waiting procedure (p<0.05). Our specialized waiting room for pediatric patients is an effective non-pharmacological method to alleviating preoperative anxiety, increasing parents' satisfaction score, and enhancing recovery quality of the 1st postoperative day.

Keywords

Pediatrics, Preoperative Anxiety, Nursing, Non-Pharmacological Method

1. Introduction

Anxiety is an emotional response, which shows different emotional manifestations due to different subjective feelings of individuals. People often use words such as "fear", "worry", "dread", "panic" to describe the complex psychological state of anxiety. The North American Nursing Diagnosis Association (NANDA) defines anxiety as an individual's concomitant autonomic response, such as vague feelings of unknown, uncomfortable feelings, and depression due to the expectation of danger. Preoperative anxiety mainly manifested as worry and fear of surgery, and somatic reactions included palpitations, chest tightness, frequent urination, abdominal pain, diarrhea and sleep disorders. Somatic reactions can lead to adverse cardiovascular events such as increased blood pressure and increased heart rate [1]. However, the characteristics of preoperative anxiety in children are not the same with adults, such as crying, which poses a great challenge to establish intravenous access before surgery. At the same time, the increase of airway secretion caused by crying greatly increases the risk of anesthesia and the difficulty of airway management. In addition, preoperative anxiety is associated

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with an increased incidence of postoperative delirium, anxiety-related postoperative behavioral changes, increased postoperative pain, and increased analgesic requirements [2, 3]. These adverse effects may lead to delayed recovery and even postoperative complications, which may lead to increased economic and psychological burden on the patient's family.

With the deepening researches on preoperative anxiety in children, researchers from different countries have reported the effects of many interventions on anxiety. The preoperative waiting area is the first space for children before entering the operating room. Because children are unfamiliar with the surgical environment and surgical personnel, they have a sense of unknown about what is going to happen. Then, they are more likely to suffer anxiety. An international study has shown that more than 75% of pediatric patients have anxiety before surgery [4]. Studies have shown that preoperative interventions, such as preoperative games, virtual reality technology, and robot companion, are beneficial to alleviate children's preoperative anxiety, which has become a standard procedure in developed countries in Europe and the United States [5-7]. Moreover, developed countries generally adopt a more comprehensive approach to psychological care, including a child-friendly medical environment, professional psychological counseling for children, and active communication with children and their parents. However, in many developing countries, there is a significant lack of attention to preoperative anxiety and intervention measures.

Since the proportion of pediatric surgery has gradually increased in developing countries and regions, it is vital to establish precautionary strategies tailored to local conditions. Herein, we formulated a systematic preoperative prevention for pediatric anxiety in the waiting room. We hypothesized that children in the specialized preoperative waiting room would have lower anxiety level.

2. Methods

2.1. Study Design, Randomization and Setting

This is a single center, open label, randomized controlled trial. The random sequence was generated by SPSS 22.0 software. The grouping information was then encoded according to the random sequence. Opaque sealed envelopes were used to store grouping code. When the subjects were recruited, an investigator opened the envelopes in order to determine grouping. The study was conducted at Deyang People’s Hospital & Women and Children’s Hospital.

2.2. Inclusion and Exclusion Criteria

Children who were 3 to 7 years old and accompanied by at least one legal guardian were considered to be included.

Those met the following criteria were excluded: (1) with a history of mental and psychological disorders or a family history of mental illness; (2) unable to communicate with the investigators; (3) critical illness, emergency operation; (4) combined with severe metabolic diseases; (5) combined with congenital self-care disorder; (6) with developmental abnormalities or congenital malformations.

2.3. Interventions

Children in the control group underwent routine preoperative visit one day before surgery. On the surgery day, children and their guardians were taken to the door of the operating room to wait for surgery.

Children in the study group were taken to the specialized preoperative waiting room. The guardians were allowed to go into the room to accompany children. The specialized preoperative waiting room was arranged into a warm, comfortable and interesting area. The configuration and procedure were as follows: (1) There were a variety of toys, books, drawing boards, etc.; (2) Popular science knowledge posters about children's general anesthesia surgery were posted on the walls, and the basic procedures, precautions and common problems of surgery and anesthesia were introduced to children and parents with simple, vivid and interesting words and pictures; (3) Professional anesthesia nurses were equipped to interact and communicate with children. Children > or = 6 years old were also taught diaphragmatic breathing and progressive muscle relaxation; (4) Set up a TV or tablet in the play area and play some cartoons or videos suitable for children, or let children choose their own programs; (5) Anesthesia equipment, such as the mask, screwed pipe, anesthesia machine and monitor, were displayed and children were encouraged to touch and try the commonly used anesthesia equipment; (6) Encouragement and reward measures in the play area, such as giving children stickers, small gifts, etc., were set to praise their bravery and cooperation, and enhance their self-confidence and enthusiasm.

2.4. Study Procedure

The investigator who was responsible for preoperative visit evaluated the eligibility. Eligible children and the guardians were informed the study. After getting the informed consent, the children were enrolled into this trial. Children were allocated into the control group or study group in a 1:1 ratio. On the surgery day, the subjects were taken to the waiting area in order. According to the grouping information, they waited for surgery in the specialized room or at the door of operating room. Investigators in the waiting area evaluated the anxiety score, crying times, separation emotion and satisfaction score of the guardians. Investigators in the operating room evaluated the pre-induction performance of children. The anesthesia medication plan was the same between the groups. Intraoperative information, such as the duration of surgery, surgery name, blood lose and analgesic methods, was documented. All children were transported into the post-anesthesia care unit for recovery.

Post-surgery care was in line with the related guidelines. The quality of post-surgery recovery was evaluated on the 1st, 3rd and 7th post-surgery day by interview or phone call.

3. Outcomes

3.1. Primary Outcome

The primary outcome of this study was the anxiety score of the children. Children's Emotional Manifestation Scale (CEMS) was applied to evaluate the anxiety before surgery [8].

3.2. Secondary Outcomes

The secondary outcomes were as follows:

1) Crying times: The total crying times before anesthesia induction, including in the waiting area and operating room.
2) Separation emotion: The emotion of children during separation with their guardians. The emotion was recorded as happy, peace, depressed or scared.
3) The degree of coordination: The performance during pre-anesthesia preparation in the operating room before anesthesia induction. The performance was described as actively cooperation, passive cooperation and resistance.
4) Satisfaction score of parents: 0 to 10 points. Ten represents extremely satisfactory with the procedure. Satisfaction scores were obtained after the children were sent into the operating room.
5) Quality of recovery: The QoR-15 scale was applied to evaluated the recovery quality [9]. The answers were from children or their parents.

3.3. Statistics Analyses

SPSS 22.0 software was applied to do the statistics analyses. Count data were presented as case number or percentage. The chi-square test or Fisher's exact test was used to analyze the differences between the groups. For measurement data, the Kolmogorov–Smirnov test was applied to identify the distribution of data. Data obeyed normal distribution were depicted as the mean ± standard deviation (SD), while abnormally distributed data will be shown as the median (inter-quartile range). Independent t-test and Kruskal–Wallis test will be used to compare differences between the two groups, respectively. $P < 0.05$ is considered as statistically significant.

4. Results

In total, 186 children were evaluated for eligibility. Ten of them did not meet the criteria, while 26 refused to participate in this study. There were no withdrawal or dropout subjects. Therefore, 150 children were included and analyzed. The study procedure is shown in Figure 1. Demographic data and intraoperative information, including age, sex, height, weight, duration of surgery and anesthesia and the surgery type) were comparable between the groups ($p>0.05$, Table 1).

Table 1. *Demographic and surgical information of the children between the study group and control group.*

Parameters	Control group (n=75)	Study group (n=75)	*P* value
Sex (male: female) (n)	43:32	46:29	0.740
Age (years)	5.34±2.56	5.02±2.33	0.372
Height (cm)	115.32±10.56	114.55±12.36	0.322
Weight (kg)	22.23±3.56	21.41±4.28	0.183
Surgery length (min)	32.46±4.59	33.88±5.11	0.711
Anesthesia length (min)	51.22±2.83	52.16±3.19	0.690
Surgery (n, %)			0.671
inguinal hernia	63, 84.00%	60, 80.00%	
hydrocele	12, 16.00%	15, 20.00%	

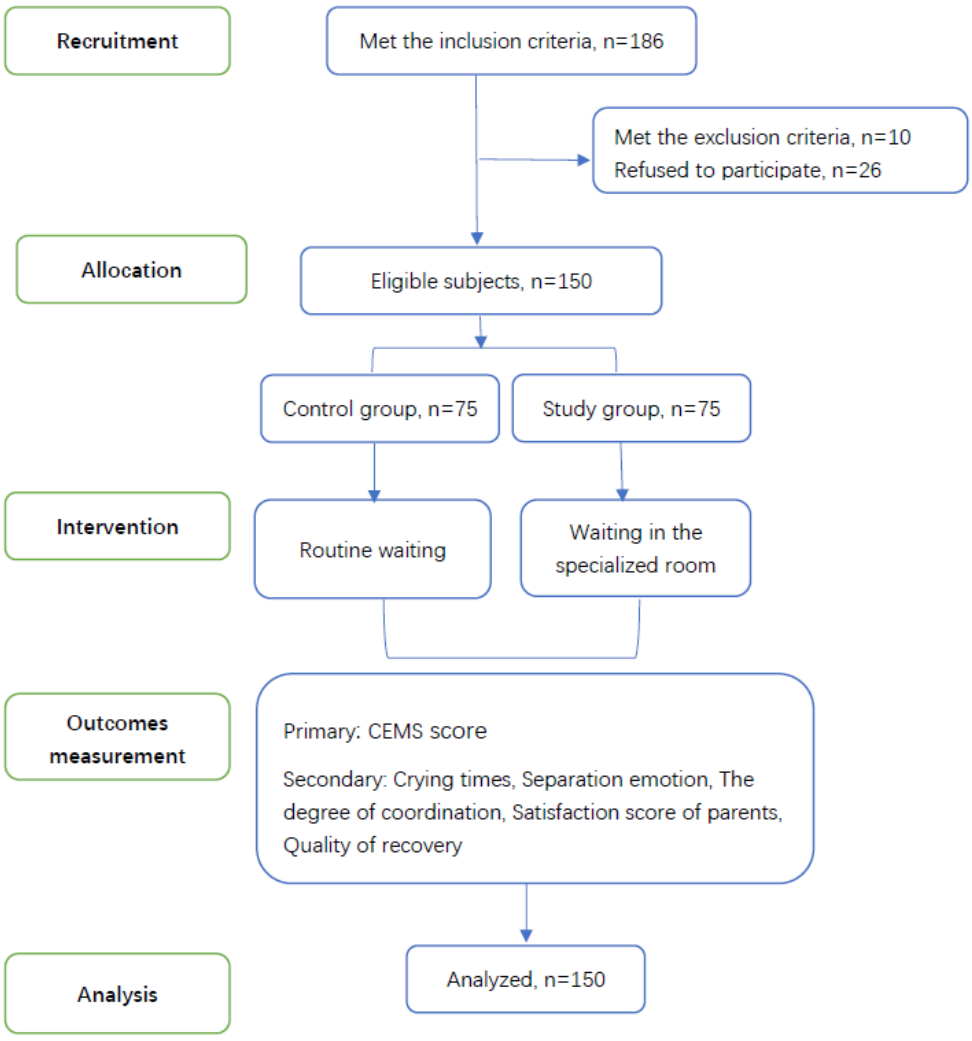

Figure 1. *Flowchart of the study. CEMS, Children's Emotional Manifestation Scale.*

Table 2. *The differences in crying times, satisfaction score, separation score and degree of cooperation between the groups.*

Outcomes	**Control group (n=75)**	**Study group (n=75)**	***P* value**
Crying times (n)	2 (1,2)	1 (0,1)	0.013
Satisfaction score	8 (7,8)	9 (9,10)	0.003
Separation emotion (n, %)			<0.001
Happy	2, 2.7%	15, 20%	
Peace	10, 13.3%	31, 41.3%	
Depressed	14, 18.7%	15, 20%	
Scared	49, 65.3%	14, 18.7%	
Degree of coordination (n, %)			<0.001
Actively cooperation	5	16	
Passive cooperation	14	32	
Resistance	56	27	

The CEMS score in the control group was 10.64 ± 2.76, while it was 5.25 ± 1.38 in the study group (P =0.001, Figure 2). The crying times of study group were significantly less than that of control group (1 (0,1) vs. 2 (1,2), P = 0.013, Table 2). The guardians in the study group also gave higher evaluation than those in the control group did (9 (9,10) vs. 8 (7,8), P = 0.003, Table 2). The separation emotion was better in the study group when compared with the control group (P =0.001, Table 2). Moreover, when children got into the operating room, those in the specialized preparation room had higher cooperation degree (P < 0.05, Table 2).

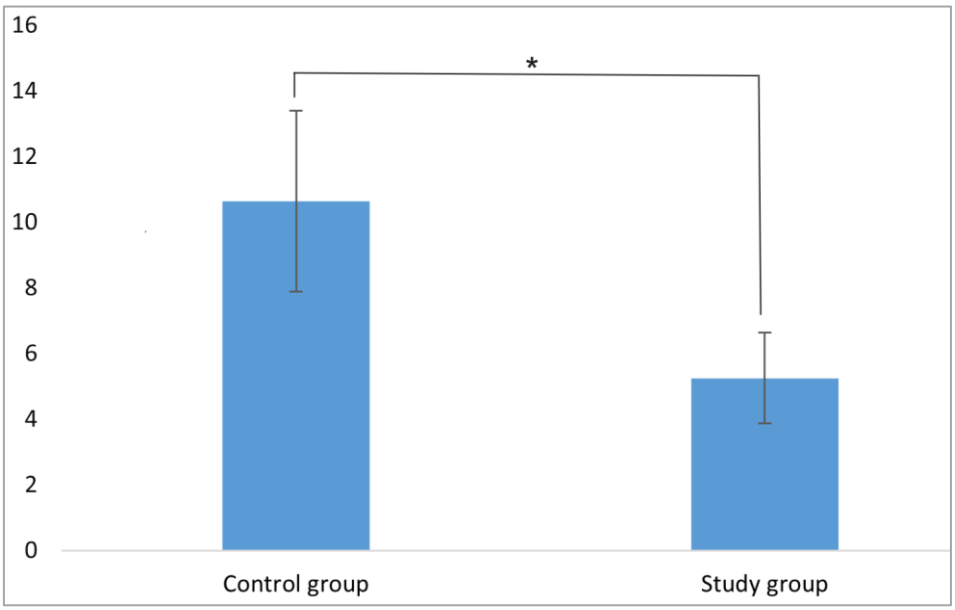

Figure 2. *The comparison of CEMS score between the two groups. *, the p value is less than 0.05.*

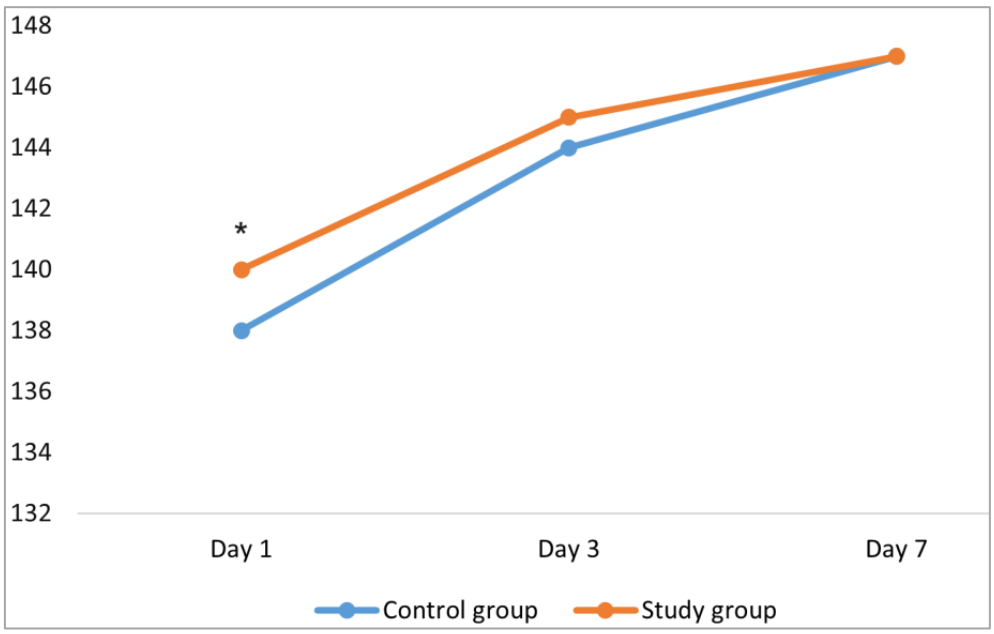

Figure 3. *The quality of postoperative recovery in the groups. *, the p value is less than 0.05.*

As for the quality of post-surgery recovery, the overall score of QoR-15 in the study group was higher than that of control group (140 (137, 143) vs. 138 (134, 140), P = 0.001, Figure 3) on the 1st postoperative day, while there was no significant difference between the groups on the 3rd or 7th postoperative day (145 (143, 148) vs. 144 (143, 147), P = 0.501; (147 (145, 149) vs. 147 (146, 149), P = 0.721; respectively, Figure 3).

5. Discussion

In the present study, we promoted a specialized preoperative waiting room for children and evaluated the influences on preoperative anxiety and quality of recovery. The results of this study indicated that the specialized preoperative waiting room was effective on reducing preoperative anxiety, improving separation emotion and degree of cooperation, and increasing the satisfaction score and the quality of recovery on the 1st post-surgery day. However, it had no significant effects on the quality of recovery on the 3rd or 7th post-surgery day.

Preoperative anxiety is a common mental and psychological disorder, especially in children. The impacts of preoperative anxiety in children can not only lead to adverse effects of cardiovascular system, but also lead to crying, resistance to preoperative preparation, and increased airway secreta. Therefore, it is very important to take measures to alleviate preoperative anxiety. On the one hand, preoperative medication has been widely reported. Midazolam, dexmedetomidine and melatonin have been reported to reduce preoperative anxiety of pediatric patients [10-12]. Recently, oral midazolam solution was approved by the Chinese government. Children are preferred to the sweet dosage form [10]. Moreover, oral midazolam was proved more anxiolytic and less sedative compared to intranasal dexmedetomidine [11]. However, sedation drugs can also cause some adverse effects, such as inhibited breathing, postoperative agitation, behavioral changes, and prolonged recovery time [13, 14]. Preoperative non-pharmacological measures should be considered as a priority to medication for children. On the other hand, many studies have explored the effects of non-drug strategies on preoperative anxiety in children. In the present study, the specialized room for pediatric patients significantly improved the preoperative anxiety, separation emotion and performance in the operating room. Our specialized room synthesized effective non-pharmacologic approaches to preoperative anxiety, such as preoperative guided imagery [15], active distraction [16, 17], introductions of the operating room and anesthesia devices by pictures, videos and virtual reality technology equipment [18], and therapeutic play [19]. We added encouragement and reward measures to increase the participation of the children.

We also observed the effects of preoperative anxiety on postoperative recovery quality. Our results indicated that children in the specialized waiting room had better recovery on the 1st postoperative day, but not on the 3rd or 7th day. Stergiopoulou A, et al [20, 21] observed that the interactive multimedia and preoperative education decreased preoperative anxiety and postoperative pain of patients undergoing elective laparoscopic cholecystectomy. Preoperative nursing visit was reported to have similar effects [22]. However, recent studies indicated that preoperative medication of sedatives and non-pharmacological interventions could reduce anxiety and improve the quality of anesthesia recovery, but could not improve the postoperative recovery [23-25]. The different surgery type and evaluation scales might account for these differences. Further studies should detect some objective outcomes, such as the hormone level.

There are some limitations in the present studies. For one thing, it is hard to control the duration of stay either in the specialized room or at the access of operating room. Because the duration of surgery and anesthesia recovery can hardly be the same. We also did not compare the duration of stay. However, the enrolled surgery types were practiced in our hospital and the duration of surgery and anesthesia was much the same according to previous experience. For another, the outcomes were based on scales, lacking objective evidence. However, there is no parameter correlated to anxiety directly. The scales we used have been well verified.

6. Conclusion

Our specialized waiting room for pediatric patients is an effective non-pharmacological method of alleviating preoperative anxiety, improving the separation emotion and cooperation in the operating room, increasing parents' satisfaction score, and enhancing recovery quality of the 1st postoperative day. Well-designed multicenter studies are needed to further determine effects of the specialized waiting room in pediatric surgery.

Abbreviations

CEMS: Children's Emotional Manifestation Scale
NANDA: North American Nursing Diagnosis Association

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Conflicts of Interest

The authors declare no conflicts of interest.

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