# Effect of therapeutic play on pre- and post-operative anxiety and emotional responses in Hong Kong Chinese children: a randomised controlled trial

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## KEY MESSAGES

1. Play is a very important part of children's lives even when they are ill. Awareness of the importance of play in nurses, parents, and health care professionals should be promoted.
2. There is empirical evidence of the effectiveness of therapeutic play intervention in preparing children for surgery.
3. The transferability, feasibility, and cost-effectiveness of therapeutic play intervention in Hong Kong clinical settings are supported.

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## Introduction

Surgery, in particular the preparation procedure for anaesthesia, can be very stressful for children and has a profound effect.[1,2] Excessive anxiety and stress can affect children's physical and mental well-being, hinder their ability to cope with surgery, and inhibit their postoperative recovery. Psychological needs of children are seldom taken into consideration. In a study of paediatric day surgery in Hong Kong Chinese children, the preoperative anxiety level of the children was high, despite having received information on pre- and post-operative care.[1]

Therapeutic play intervention in preparing children for hospitalisation and medical procedures has increased. Nevertheless, studies to assess the implementation potential of therapeutic play intervention, including the transferability, feasibility, and cost-effectiveness, in preparing children for surgery in Hong Kong clinical settings are lacking. This study aimed to examine the effectiveness of therapeutic play intervention in preparing children undergoing elective surgery and assess the implementation potential of such intervention in Hong Kong clinical settings.

## Methods

The study was approved by the hospital ethics committee and conducted from November 2009 to November 2011. Written consent was obtained from the parents. A total of 108 children admitted for elective surgery who were aged 7 to 12 years, able to speak Cantonese and read Chinese, and accompanied by their parents (either mother or father) on the preoperative assessment day and day of surgery were randomised to the experimental (n=51) or control (n=57) groups. However, five children in the experimental group failed to attend the intervention and four children were lost to follow-up. Children who had undergone surgery previously, or had identified cognitive and learning problems were excluded.

Children in the control group received routine preoperative information preparation, including preoperative fasting time, physical health care and preparation, personal hygiene, postoperative wound care, possible postoperative complications and their management, and methods of controlling postoperative pain. Children in the experimental group received usual care plus therapeutic play intervention, which was implemented in a small group with a maximum of 5 children. The intervention was standardised and lasted for 1 hour (Table 1).

The anxiety level of all children and parents was assessed using the Chinese version of the State Anxiety Scale for Children and Adults at three time points: preoperation (before intervention), preoperation (after intervention), and postoperation. Children's emotional responses during the procedure of anaesthesia were documented using the Children's Emotional Manifestation Scale. Before discharge home, the Postoperative Parents' Satisfaction Questionnaire was used to measure the patient's perception of the adequacy, relevancy, and understanding of the preoperative information.

TABLE 1. Therapeutic play intervention protocol

| Time | Activities |
|---|---|
| 00:00 | 1. In the operating theatre: research nurses meet the children and their parents and explain the procedures that will be performed: identification and verifying the information, checking the bracelet, and checking the consent form.<br>2. The environment and equipment are introduced, including the operating table, anaesthetic and monitoring machines, and operating lamp. |
| 00:10 | 1. In the operating theatre: doll demonstration on obtaining vital signs for the child: (1) apply electrocardiographic electrodes on the doll's upper chest and lower trunk, (2) place a pulse oximeter on the doll's finger, (3) attach a blood pressure cuff to the doll's arm, and (4) apply a stethoscope to the doll's chest and explain how the doctors and nurses will use it to listen to the child's heart and lungs.<br>2. Doll demonstration on receiving oxygen and anaesthesia gas therapy: (1) explain the purposes of the oxygen mask and anaesthesia gas, (2) apply the anaesthetic mask on the doll, and (3) give the children the mask and ask them to try it on.<br>3. Doll demonstration on intravenous therapy: (1) explain the purposes of setting up an infusion line, (2) show the soft catheter and demonstrate how this soft catheter will be put in to the doll's forearm, and (3) reinforce to the children that such a procedure will only be performed after they are asleep. |
| 00:25 | In the operating theatre: encourage each child to return demonstrate the procedures on the doll with supervision and guidance. |
| 00:50 | In the recovery room: tell the children that they will stay for around 30 minutes and their parents will stay with them when they regain consciousness from anaesthesia, and explain to the children that some procedures will be performed: measurement of blood pressure, pulse rate, electrocardiograph, and oxygen saturation, and receipt of oxygen therapy. |
| 00:55 | Question and answer session: clarify any misconceptions and queries, and reassure the children that they will be asleep during the whole surgical procedure and will only wake up after the surgery. |
| 01:00 | End of the therapeutic play intervention. |

Additionally, a semi-structured interview was conducted for selected children, parents, and nurses working in the operating theatre.

Intention-to-treat analysis was used, with missing data substituted by the last observation carried forward method. The homogeneity of the experimental and control groups in terms of demographic, clinical, and baseline data were assessed using inferential statistics (independent *t*-test and chi-square test). Mixed between-within subject analysis of variance (ANOVA) was used to determine which intervention was more effective in reducing the state anxiety of children and their parents. Independent *t*-test was used to determine any difference in the mean scores of children's emotional responses during anaesthesia induction, and parents' satisfaction between the experimental and control groups. Additionally, content analysis was used to draw conclusions by creating categories of data from verbatim or unstructured data.

## Results

The experimental and control groups were similar with respect to the age and sex of the children, parents' educational attainments, type of surgery performed, and the baseline state anxiety levels of parents and children (Table 2).

### Effects of intervention on children

Mixed between-within subject ANOVA indicated a significant main effect for intervention. Children in the experimental group reported lower state anxiety scores than children in the control group (Table 3). Using the guidelines proposed by Cohen,[3] the partial eta squared of 0.06 indicated that the effect size for the intervention was moderate. An independent t-test showed a significant difference in mean Children's Emotional Manifestation Scale scores between the two groups ($t$ [106]=−5.03, P<0.001). Children who received the therapeutic play intervention exhibited fewer emotions at induction of anaesthesia. The partial eta squared of 0.19 indicated that the effect size for the intervention was large.

### Effects of intervention on parents

Mixed between-within subject ANOVA indicated no significant difference in parents' anxiety scores between the two groups. The partial eta squared of 0.03 indicated that the effect size for the intervention was small. An independent *t*-test showed a significant difference in mean satisfaction score for parents in the two groups ($t$ [106]=3.04, P=0.003). Parents of children receiving therapeutic play intervention reported more satisfaction. The partial eta squared of 0.08 indicated that the effect size for the intervention was moderate.

### Process evaluation

Semi-structured interviews indicated that the therapeutic play intervention was feasible and acceptable to both health care providers and participants.

## Discussion

This study demonstrated the effectiveness of therapeutic play intervention in preparing children

TABLE 2. Baseline characteristics of the experimental and control groups

| Variable | No. (%) of participants | | P value* |
|---|---|---|---|
| | Experimental group (n=51) | Control group (n=57) | |
| Age (years) | | | 0.81 |
| 7 | 6 (11.8) | 7 (12.3) | |
| 8 | 9 (17.6) | 11 (19.3) | |
| 9 | 10 (19.6) | 11 (19.3) | |
| 10 | 11 (21.6) | 12 (21.1) | |
| 11 | 10 (19.6) | 11 (19.3) | |
| 12 | 5 (9.8) | 5 (8.8) | |
| Sex | | | 0.69 |
| Male | 33 (64.7) | 40 (70.2) | |
| Female | 18 (35.3) | 17 (29.8) | |
| Type of surgery performed | | | 0.89 |
| Circumcision | 17 (33.3) | 17 (29.8) | |
| Herniorrhaphy | 8 (15.7) | 6 (10.5) | |
| Eye operation | 7 (13.7) | 8 (14.0) | |
| Ear, nose, and throat operation | 7 (13.7) | 16 (28.1) | |
| Dental operation | 5 (9.8) | 8 (14.0) | |
| Orthopaedic operation | 7 (13.7) | 2 (3.5) | |
| Parents' education attainment | | | 0.27 |
| Primary school or below | 4 (7.8) | 12 (21.1) | |
| Lower secondary school | 15 (29.4) | 16 (28.1) | |
| Upper secondary school | 22 (43.1) | 21 (36.8) | |
| University or above | 10 (19.6) | 8 (14.0) | |
| Mean±SD State Anxiety Score of children | 16.67±3.42 | 16.33±3.24 | 0.60 |
| Mean±SD State Anxiety Score of parents | 36.67±7.51 | 36.21±6.88 | 0.74 |

* *t* test for continuous variable and Chi-square test for nominal and categorical variables

TABLE 3. Split-plot analysis of variance on State Anxiety Scores of children and parents across three time points (n=108)

| Variable | State Anxiety Scores of children | | | | State Anxiety Scores of parents | | | |
|---|---|---|---|---|---|---|---|---|
| | *F* value | P value | Eta squared | Observed power | *F* value | P value | Eta squared | Observed power |
| Main effect for time | 307.79 | 0.00 | 0.85 | 1.00 | 370.61 | 0.00 | 0.88 | 1.00 |
| Interaction effect | 78.56 | 0.00 | 0.59 | 1.00 | 31.75 | 0.00 | 0.38 | 1.00 |
| Main effect for intervention | 6.08 | 0.02 | 0.06 | 0.82 | 2.59 | 0.11 | 0.03 | 0.61 |

for surgery. Return demonstration of the procedures on the doll enabled the children to practise the procedure of anaesthesia induction in an active rather than passive manner. This enabled the children to act out unpleasant experiences and minimise their negative emotional response, as lack of control is one of the major sources of stress for children undergoing surgery.[4] Therapeutic play intervention enhanced the children's sense of control through visiting the operating room so as to increase their familiarity with the environment. Through demonstration and return demonstration of the procedures of preparing for anaesthesia, the children became desensitised to these potential stressful situations and acquired a greater sense of control. Even though parents did not directly participate in the therapeutic play activities, they could also benefit from watching the activities as the explanations given to children would, in turn, make them feel more comfortable and well-informed.

The most important step in carrying out evidence-based nursing practice is to assess the potential implementation of an evidence-based innovation in clinical settings, including the transferability, feasibility, and cost-effectiveness of the innovation. Therapeutic play intervention can be transferable to all children regardless of different cultural backgrounds or settings. Play is instinctive, voluntary, and spontaneous; just like birds fly and fish swim.[5] Therefore, play is a very important part of children's lives even when they are ill. Therapeutic play intervention was feasible, as it was implemented on either Saturday afternoon, Sunday, or a public holiday in which no elective surgery was performed in the hospital, and it caused only minor disturbance to the operating theatre. Therapeutic play intervention was acceptable by children, parents, and health care professionals. Most children enjoyed the therapeutic play and found such activities full of fun and interesting. Besides, most parents commented that it was worthwhile and helpful to attend the therapeutic play intervention even though they had to spend extra time in the hospital. Additionally, most of the nurses agreed that therapeutic play is feasible to be implemented in the operating theatre provided that there is adequate support from the hospital organisation. Therapeutic play intervention is cost-effective, as its content is already very familiar to nurses. It took only an hour of a staff nurse's time to provide fairly comprehensive preoperative psycho-educational care to a group of children and their parents. It is economically feasible for the health care system to consider it as a routine nursing preparation of children for surgery.

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