

# Preoperative Interactive Communication Program to Children and Effects at Induction of General Anaesthesia

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## ABSTRACT

**Aim:** To evaluate the effectiveness of a preoperative interactive communication program on the behavior of children at the time of induction of general anaesthesia.

**Study design:** Randomized, controlled trial

**Place of study:** The Children's Hospital and the Institute of Child Health, Lahore.

**Methods:** Surgical outpatients, ASA physical status I and II, aged 5-10 year scheduled to undergo general anaesthesia and elective surgery, were enrolled. 80 patients were divided in control (n=40) and interventional groups (n=40). Control group A received routine preoperative evaluation and preparation. Interventional group B received interactive model based communication program in preoperative time. Both groups were assessed in the preop holding time and in the operating room at the time of induction by using Global Mood Score.

**Results:** Children's behavior as measure by the global mood score increased in control group of preoperative holding time in comparison to preoperative holding time of interventional group as in and Chi Square is 104-161 and P-Value=0.000 statistically significant. Global Mood Score in operating room time at induction of anaesthesia of control group increases as compare to operating room time of induction of anaesthesia of the interventional group. Chi-Square = 21.939 and P-value is 0.039

**Conclusion:** Paediatric surgery centre personnel should consider the prescription of preparation programs based on available resources, and characteristics of children, to achieve the effective cooperation of children at the time of induction of general anaesthesia.

**Keywords:** Preoperative interactive communication; induction of anaesthesia;

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## INTRODUCTION

Cultural, traditional and economical factors affect the care of our patients. Success of anaesthesia is no longer determined solely by the avoidance of mortality and morbidity. A greater emphasis on child centered care is developing with parents and children.

In 1960, medical ethicist and noted anaesthesiologist Henry Beecher and Colleagues showed that personal preoperative communication with patients can result in both physiologic and psychological improvement in patient care.<sup>1</sup> Older children have benefitted more from psychological preparation, while the younger ones have benefitted from pharmacological methods.<sup>2, 3</sup> The school aged children can understand verbal and written information (with pictures). Preoperative education has included tours of the operating room, puppet shows, books and video tapes<sup>4,5,6,7</sup>. Various interventions, including sedative premedication, parental presence during induction and preoperative

preparation programs are available to reduce the anxiety of a child during the preoperative period<sup>8</sup>. Recent data, however, indicate that many anaesthesiologists do not use any of these interventions routinely<sup>9,10</sup>. Thus it is likely that a significant number of children in the United States are distressed and fearful during the induction of general anaesthesia. In our setup, hospital care is mainly disease oriented and custodial. The simple, often common-sense guidelines, incorporated in style of interacting with children, would greatly reduce most children anxiety and apprehension concerning induction of anaesthesia.

## METHODS

Surgical outpatients aged 5-10 year, ASA physical status I and II, scheduled to undergo general anaesthesia and elective outpatient surgery, were considered for enrollment. Patients were excluded from the study if they had a history of previous surgery, hospitalization, prematurity, chronic illness, development delay, predicted difficult intubation, language barrier, intellectual disability. Patients were enrolled by a nurse at the time of their preanaesthetic evaluation, and randomly assigned by a lottery method to the intervention or control group. The

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control group received a routine pre.op holding stay time and to the process of induction of general anaesthesia in the operating room. In the control group, the anaesthesiologist was allowed to interact with the child according to her/his own routine. Children in the intervention group received preoperative interactive model based introduction of process of induction of general anaesthesia. The model used was toy telephone with attached T-piece breathing circuit to demonstrate the inhalational induction of anaesthesia with scented anaesthesia mask. (Fig 1)

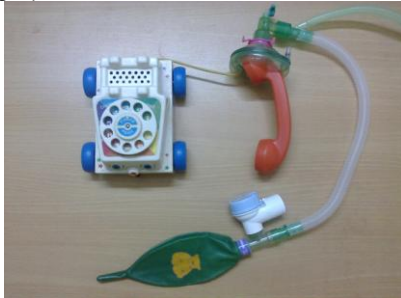


Fig. 1: Model Toy Telephone with T-piece Breathing Circuit and Anaesthesia Mask

Children were given time to learn how to use and become engaged with the interactive inhalation method. A mannequin of vascular cannulation used to demonstrate the intravenous induction method. It was demonstrated on a mannequin for intravenous line placement. Pulse oximeter probe for the finger. All parents of the children get NPO instructions, and a brief summary of the anaesthetic induction. Written informed consent was obtained from the parents (attendant). The attending anaesthesiologist was unaware of the assigned intervention group of the child. The impact of the intervention was assessed by measuring changes in children’s behavior at the preoperative holding area and in the operating room at the time of induction of general anaesthesia. The changes in behavior of children were assessed by the Global Mood Score (GMS) (Table 1) and choice of induction method of anaesthesia was noticed in intervention group. Each child behavior was also scored using the Global Mood Score at the preoperative holding area and at the time of induction of general anesthesia in the operating room. It was noticed by blinded observer. The Global mood score is a seven point scale based on objective behavior criteria and has been frequently used to assess behavioral interventions<sup>11, 12</sup> responses at each time (pre.op holding area, operating room at the time of induction) for the two groups. All patients were brought into the operating room accompanying by the anaesthetist and communication on the way, on the operating room table, SpO<sub>2</sub> probe was placed on the

child’s finger. O<sub>2</sub>/N<sub>2</sub>O introduction in a ratio of 1:1 and sevoflurane was started in a concentration of 2%, and then increased 4% and 6% every three breaths, if the child gets choice for mask induction of anaesthesia. The children who refused to get mask induction of anaesthesia, they get intravenous induction of anaesthesia. A total of 80 children, who fulfil the inclusion criteria, were enrolled in the study. Demographic details (Name, Age, sex, height and weight) were noted along with the necessary medical history. Then patients were divided equally into two groups (40 children in each group).

Group A: Control Group

Group B: Interventional Group

Global Mood Score (GMS) for each child was assessed. All this information was gathered by using a pre-designed Performa.

Table: 1: Global Mood Score

1	Attentive and active in happy or contented way. Interested in playing or other constructive activity.
2	Attentive to surroundings but not especially happy appearance. Unconstructive play and activity.
3	Passive, vacant expression, generally quiet and not playing. Dozing or sleeping.
4	Unhappy, worried or anxious appearance without crying.
5	Marked unhappiness. Whining, whimpering, moaning, or soft crying: isolated indications of distress.
6	Moderate crying or intermittent but fairly constant sobbing; several non-crying reactions suggesting distress.
7	Screaming full blast. Intense and constant crying without paying attention to anything.

Table: 2a: Demographic characteristics of patients

Variables	Group A (n=40)	Group B (n=40)
Age (years)	7.12±1.4	7.18±1.6
Weight (Kg)	23.16±6	26.08±5
Gender M/F (n)	25/15	23/17

Table: 2b: Surgical Characteristics of patients

Surgical procedure	Group A (n=40)	Group B (n=40)
Cystoscopy	12	10
Adenoidectomy	2	3
Tonsillectomy	5	5
Diagnostic bronchoscopy	3	2
DJ removal	3	3
Ophthalmic procedures (laser)	4	6
Dental extraction	2	2
Hernia	2	4
Circumcision	2	1
Dermatological procedures	5	4

**RESULTS**

All the collected data was entered and analyzed using SPSS-version 23.0. Initial analysis included frequency distribution and calculation of descriptive statistics. All the Qualitative variables were presented in form of multiple bar charts with respect to study groups by using frequency tables and appropriate charts. Chi-Square test was used to see any association between final outcome and both study groups with corresponding 95% CI. P-value <0.05 was taken as significant. A total of eighty children were enrolled in the study. There were no differences between the intervention and control groups with respect to age, and type of surgery. (Table 2) forty children were inducted in each group, control group and intervention group. Children's behavior as measure by the global mood score increased in control group of preoperative holding time in comparison to preoperative holding time of interventional group as in (Table 3)(Fig 2) and Chi Square is 104-161 and P- Value = 0.000 statistically significant. Global mood score in operating room time at induction of anaesthesia of control group increases as compare to operating room time of induction of anaesthesia of the interventional group. (Table 4) (Fig 3) Chi-Square=21.939 and P-value is 0.039 which is statistically significant.

Fig. 2: Operating room Time of Induction of Anaesthesia of Control Group

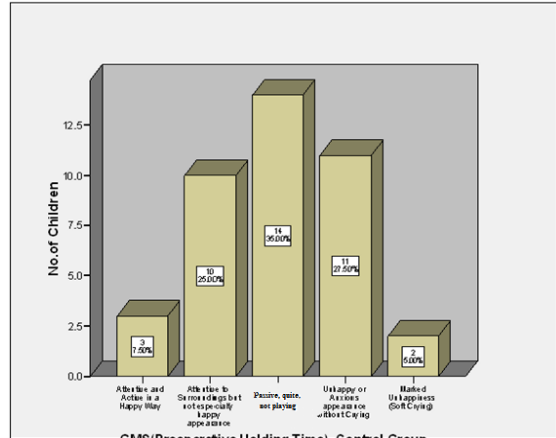


Fig 3: GMS (Operating room Time of Induction of Anaesthesia)\_Interventional Group

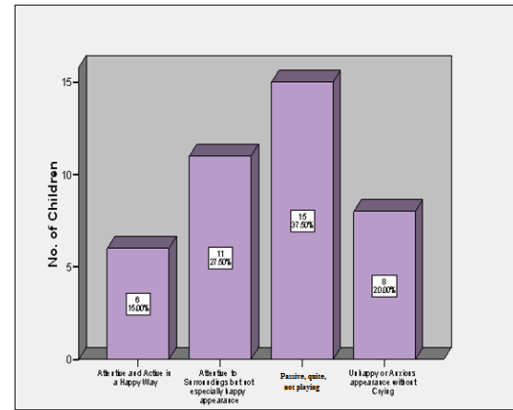


Table 3: GMS (Preoperative Holding Time)\_Control Group \*GMS(Preoperative Holding Time) Interventional Group Crosstabulation

GMS (Preoperative Holding Time) Interventional Group	Attentive and Active in a Happy Way	Attentive to Surroundings but not especially happy appearance	Passive, quite, not playing	Unhappy or Anxious appearance without Crying	Marked Unhappiness (Soft Crying)
Attentive and Active in a Happy Way	3	0	0	0	0
Attentive to Surroundings but not especially happy appearance	1	9	0	0	0
Passive, quite, not playing	0	2	9	3	0
Unhappy or Anxious appearance without Crying	0	0	4	7	0
Marked Unhappiness (Soft Crying)	0	0	0	0	2

Chi-Square =104.161

P-Value=0.000 (Statistically Significant)

Table 4: GMS (Operating room time of induction of anaesthesia) Control Group \*GMS (Operating room Time of induction of Anaesthesia) Interventional Group Cross tabulation

	Attentive and Active in a Happy Way	Attentive and Active in a Happy Way	Passive, quite, not playing	Unhappy or Anxious appearance without Crying	Anxious without Crying
Attentive and Active in a Happy Way	0	1	2	0	0
Attentive to Surroundings but not especially happy appearance	3	2	5	0	0
Passive, quite, not playing	2	7	3	2	2
Unhappy or Anxious appearance without Crying	0	1	4	6	6
Marked Unhappiness (Soft Crying)	1	0	1	0	0

Chi-Square =21.939

P-Value=0.039 (Statistically Significant)

**DISCUSSION**

Preoperative teaching programs have been advocated to decrease both the response to stress and the anxiety surrounding an operation<sup>13</sup>. It is well documented that many children report fear and become distressed with anaesthesia induction by mask<sup>14</sup>.

We studied preoperative interactive communication of outpatient surgical patients of school aged; our patients were of physical status ASA I, II, ambulatory, vocal, and presenting for minor and moderate surgery. The anxiety of such patients may significantly affect their experience in hospital. Measuring anxiety is complex; we used behavioral score to assess the child's behavior. Zeev N. Kain et al<sup>15</sup> study shows that the use of inpatients is particularly problematic because it is difficult to establish whether the personality changes observed were related to the induction of anaesthesia or some other preoperative events.

For a preoperative teaching program to be successful, verbal descriptions of procedures and the sensations to be experienced should be inducted<sup>16</sup> our preoperative interactive communication provided the visual, olfactory and tactile elements that children experience prior to the induction of General Anaesthesia, providing this information in an interactive format with sensory format may add to the beneficial effect at the induction of general anaesthesia<sup>4</sup>.

The results of our study that Children's behavior as measure by the global mood score increased in control group of preoperative holding time in comparison to preoperative holding time of interventional group as in (Table 3) (Fig 2) and Chi Square is 104-161 and P-Value=0.000 statistically significant. Global mood score in operating room time at induction of anaesthesia of control group increases as compare to operating room time of induction of anaesthesia of the interventional group. (Table 4)(Fig 3) Chi-Square = 21.939 and P-value is 0.039 which is statistically significant.

Schmit CK<sup>4</sup> studied that children with more information preoperatively have an elevated stress response but are more cooperative and have fewer post operative complications than controls not prepared for surgery. Padfield NL<sup>17</sup> reported that 73% of 3-9 year old children exhibited adverse behavioral changes in first two weeks following surgery. We studied only preoperative period and child's behavior at the induction of anaesthesia.

In our study, aged group of patients were 5-10 year, school aged children, children of different ages respond to stress differently. Interactive communication was one tool to this age group and

children become increasingly able to represent one thing with another, so that they can use language symbols and represent things by drawing them. The children become able to internalize the properties of objects, or classify them by size, shape or color. These comparisons can be made in their minds, which enable them to come up with answers more readily.<sup>13</sup> Concept which we used was behavioral model of child development and emphasized that most behavior is learned. Appropriate behavior may be reinforced by positive and rewarding experience, whereas inappropriate behavior may be diminished by ignoring it. This model is effective to teach children desirable behavior at the time of induction as holding the anaesthesia mask.

In the study, we avoided variables such as repeat anaesthesia, Sedative premedication, parental presence during induction and only validated behavioral tools were used to assess behavior during the induction of anaesthesia.

Jill E. Maclaren and Lindsey L. Cohen<sup>18</sup> studied the effects of two distraction strategies for venipuncture distress management in children of age 1-7 year. They used interactive toy distraction, passive movie distraction. The results were that children in the passive condition were more distracted and less distressed than children in interactive condition. Although children in the interactive condition were more distracted than standard care children, there were no differences in distress between groups. In our study, age of children was in more favorable to cognitive behavioral interaction learning. The option of use of anaesthesia mask and intravenously, both were conveyed to the children. They were provided to get a choice of any method for induction of anaesthesia

Mason et al (1999)<sup>19</sup> compared two distracters (a brief cartoon film and a short story requiring button pressing at specified points in the story) and a standard care control condition during painful procedures in seven 2-4 year old children with cancer. Results indicated that children displayed the least distress and received lower nurse and caregiver rating of distress in the interactive story condition, but no difference between the cartoon distraction and the standard care condition. The result of this study support the result of our study partially, however, the results of this study were limited by the inclusion of small sample size and problems in the administration of distraction protocols.

The findings of our study can be viewed in light of methodological issues. Few variables were controlled to increase the internal validity of the study because timing of behavioral preparation, relative to the day of surgery has been identified as affecting the response of the child to the intervention. Similarly, the

effectiveness of preoperative interventions is dependent on previous experience with surgical interventions. That is, for the child with a history of surgery, behavioral preparation may result in sensitization, producing an exaggerated emotional response<sup>4</sup>.

Melamed BG and Brophy CJ<sup>20, 21</sup> studied behavioral and physiological responses at the induction of anaesthesia are the most stressful event the child experiences during the preoperative period. Thus, it seems that the more extensive intervention was effective for low stress periods, such as preoperative holding time, but not for high-stress periods, such as the induction of anaesthesia. The level of anxiety at particularly high stress times may inhibit children's productivity remembering or thinking about what they had learned during the preoperative program. If so, reminding the child of strategies or techniques during times of high stress may help to reduce anxiety<sup>15</sup>. In our study, we conducted preoperative interactive communication on day of surgery, before preoperative holding area. Our results showed, behavior measure was significantly better in intervention group as compare to control group both in preop holding time and in the operating room at the time of induction of anaesthesia.

Zeev N. Kain et al<sup>15</sup> studied preoperative preparation program in children in three groups using an information based program (OR tour), an information + modeling based program (OR tour + video tape), or an information + modeling + coping-based program (OR tour + video tape + child-life preparation). They found that children who received the extensive program exhibit less anxiety immediately after on the day of surgery, and on separation to the operating room. These findings, however, achieved statistical significance only in the holding area on the day of surgery ( $P= 0.02$ ). Similarly, parents in the extensive program were significantly less anxious on the day of surgery in the preoperative holding area, as assessed by behavioral ( $p=0.015$ ) and physiological measures ( $p=0.01$ ). In contrast, no differences were found among the groups during the induction of anaesthesia, recovery room period, or 2 week postoperatively.

In our study, preoperative interactive communication program was effective in the preoperative holding time and in the operating room, at the time of induction as shown in results. This can be explained on the age related program and on day of surgery, so the children were able to learned and remember it, in the operating room as well.

The goal of our intervention was to improve the preparedness of paediatric surgical patient and to facilitate the induction of General Anaesthesia with reduced distress of children at the time of induction. It

provides an opportunity to educate the public (children) with regard to the role of anaesthesia before operation. Although there is a disagreement with regard to the best type of preoperative preparation, there is consensus that some type of preop preparation should be offered to children undergoing surgery<sup>15</sup>.

## CONCLUSION

Paediatric surgery centre personnel should consider the prescription of preparation programs based on available resources, and characteristics of children, to achieve the effective cooperation of children at the time of induction of general anaesthesia. The simple, often common sense guidelines, incorporated in a style of interacting with children, would greatly reduce most children anxiety and apprehension concerning induction of anaesthesia.

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