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## Observational Study

## Healthcare staff as promoters of parental presence at anesthetic induction: Net Promoter Score survey

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**Abstract****BACKGROUND**

Surgical intervention is usually a traumatic event that causes stress and anxiety in the pediatric patient and the family environment. To reduce the harmful effects of presurgical anxiety, parental presence during induction of anesthesia (PPIA) is one of the more notable interventions used in medical centers. However, data on this measure are difficult to evaluate and often face resistance from healthcare staff.

**AIM**

To analyze the perception of the healthcare workers after the implementation of a PPIA program.

**METHODS**

A survey was developed and sent by email to all the healthcare staff working in the children's area of a tertiary hospital. It consisted of 14 items divided into positive aspects of PPIA and negative aspects of PPIA evaluated with the use of a Likert scale (1 to 5). The demographics of the respondents were included in the data collected. The answers to the questions were interpreted through the Net Promoter Score (NPS). The statistical analysis compared the differences in the responses to each question of the survey made by the different groups of health personnel included.

**RESULTS**

A total of 141 surveys were sent out, with a response rate of 69%. Of the total number of responses, 68% were from women and 32% from men. The average age

enrollment.

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of the participants was  $42.3 \pm 10.6$  years. As for the positive questions about the PPIA, 83% had an NPS > 50, and only one had a score between 0 and 50, which means that the quality of the service was rated as excellent or good by 100% of the respondents. On the other hand, 100% of the negative questions about the PPIA had a negative NPS. Responses to the question "PPIA increases patient safety" were significantly different ( $P = 0.037$ ), with a lower percentage of pediatric surgeons (70%) thinking that PPIA increased patient safety, compared with anesthesiologists (90%), nursing (92%), and other medical personnel (96%).

## CONCLUSION

The personnel who participated in the PPIA program at our center were in favor of implementation. There were no validated arguments to support worker resistance to the development of the PPIA.

**Key Words:** Parental presence; Survey; Anesthesia induction; Patient-centered care; Anxiety; Surgery

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**Core Tip:** Surgical intervention is usually a traumatic event that causes stress and anxiety in the pediatric patient and the family environment. To reduce the harmful effects of presurgical anxiety, the parental presence during induction of anesthesia (PPIA) is one of the more notable interventions used in medical centers. However, data on this measure are difficult to evaluate and often face resistance from healthcare staff. With our work, we want to emphasize the acceptance and support of the health personnel of the application of PPIA in our center and the importance of family involvement in achieving a comprehensive approach for our patients.

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## INTRODUCTION

Surgical interventions are traumatic events that causes stress and anxiety in the pediatric patient and the family environment. Several studies have shown that this type of anxiety is related to undesirable events such as negative results of anesthetic induction, increased pain in the postoperative period, increased postsurgical delirium, decreased adherence to subsequent medical treatment, and behavioral changes including sleep disorders, nutritional problems, enuresis, fear of separation, and aggression[1-4]. Various strategies have been developed to mitigate presurgical anxiety in both children and their family environment, with variable results that are controversial and difficult to evaluate. The use of pharmacological interventions remains one of the most widely used tools. However, in recent years, the use of nonpharmacological measures has gained great relevance in this field, with parental presence during induction of anesthesia (PPIA) being one of the most discussed[5].

It has been reported that families prefer to participate and be present during high-stress procedures such as surgery, and those who are present generally report favorable experiences and even consider it a right[6,7]. This trend, along with the increasing development of patient- and family-centered care (PFCC), the basic concepts of which include participation and collaboration, is often objectionable to those who do not favor active participation of the patient and family in the surgical experience. Critics usually argue that a PPIA program requires additional staff and new infrastructure, increased surgical time and therefore decreased operating room efficiency, increased costs, and possible medical-legal issues[9,10]. However, there are no validated data to support those arguments, and an increasing number of hospitals are implementing this measure, with good acceptance by health staff. The objective of

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this study was to evaluate the perceptions of health care personnel regarding the implementation of the PPIA program in our center.

## MATERIALS AND METHODS

### ***PPIA implementation program***

Implementation of the PPIA program was motivated by the pediatric surgery and child anesthesia and resuscitation services at our center to achieve more patient- and family-centered medicine and after having positive experience with the same program in other centers at our medical center.

The program was implemented in June 2019 after approval by the ethics committee. The necessary space for the different phases of the program were set up, all the necessary material for the entrance to the operating room was obtained, and all the personnel involved were properly instructed in every step of the process. A pilot phase was initiated with 57 patients undergoing major outpatient surgery without the need for hospitalization (*e.g.*, epigastric herniorrhaphy, umbilical herniorrhaphy, inguinal herniorrhaphy, circumcision, hydrocelectomy, orchidopexy, and other minor surgical procedures). A future objective of this measure is potentially extending it to children undergoing conventional inpatient surgery and invasive diagnostic-therapeutic tests such as magnetic resonance imaging, computed tomography, and interventional radiology. The participating patients were between 2 and 12 years of age, were classified as American Society of Anesthesiologists status I, and 48% were premedicated with oral midazolam depending of the criteria used by the responsible anesthesiologist.

### ***Process***

The possibility of PPIA was offered to all parents or legal guardians of children cited for major outpatient surgery. The decision to be present or absent was made voluntarily by the parents or legal guardians, as was the choice of the person who would accompany the patient if there were several companions. Those who agreed to be present during anesthetic induction were given a set of rules and instructions to follow. (1) The dress code required a surgical suit, surgical cap, shoe covers, and face mask; (2) Do not touch anything, only the child, the bed, or the anesthetic mask in case of receiving the order from the anesthesiologist. (3) The phases of the process included preparation in the day hospital; moving to the presurgery room and the operating room, anesthetic induction, which includes an excitation phase with possible involuntary patient movement and hypotonia; and finally leaving the operating room. (4) The immediate postoperative phase included giving advice and instructions to understand and assist in patient recovery. The benefits and positive points of the process, such as the importance of focusing all attention on the child and the help and cooperation received from the family member at a critical time such as anesthetic induction, were reinforced at all times.

### ***Survey***

An internal survey was sent by email to all healthcare personnel involved in the process (*i.e.* pediatric surgeons, pediatric anesthesiologists, nursing and other medical staff) during the month of November 2019. The survey was composed of 14 items that were subdivided into positive aspects for PPIA and negative aspects for PPIA. The responses were graded on a Likert scale that ranged from totally disagree (1) to totally agree (5). The same questionnaire collected the demographic data of the respondents including age, gender, and the health group to which they belonged. The survey results were interpreted by the Net Promoter Score (NPS), which is a quality indicator that measures customer loyalty to companies based on recommendations. In the original version, each item has a score of from 0 to 10 where 0 is very unlikely to be recommended and 10 is strongly recommended. Scores between 9 and 10 are classified as promoters, those between 7 and 8 are passive, and those  $\leq 6$  are detractors. The final score is obtained by subtracting the detractors from the promoters and obtaining a percentage ranging from -100 to 100 that measures the quality of service, where an score  $> 0$  is good, a score  $> 50$  is excellent and a negative NPS is not a recommendation [11].

After obtaining the Likert scale scores for each item, these were transformed into values used by the NPS. Thus, scores of 4 or 5 on the Likert scale were considered as 9 or 10 in the NPS and were therefore promoters. Scores of 1 or 2, were considered as  $\leq 6$  and were therefore detractors. Finally, scores of 3 on the Likert scale were considered

as 7 or 8 on the NPS, were passive, and were not taken into account in the study. After the total numbers and percentages of promoters and detractors in percentage for each item of the questionnaire were obtained, the percentage of promoters was subtracted from the percentage of detractors of each item of the survey. An NPS > 0% indicated good quality, an NPS > 50% indicated excellent quality, and an NPS < 0% indicated poor quality. Finally, a statistical analysis was comparing the demographic characteristics and survey responses of each group was performed. Responses of < 75% were excluded.

### Statistical analysis

The data were collected using Microsoft Excel version 16.35. Statistical analysis was performed with the IBM SPSS 25.0 statistical package. Quantitative variables were reported as means and standard deviation and qualitative variables as absolute frequencies and percentages. After checking the normality of distributions of the variables with the Kolmogorov-Smirnov test (corrected by the Lilliefors test), quantitative variables were compared with the *t*-test and categorical variables with the chi-square test or the *F*-test. A *P* value of < 0.05 was considered significant; all intervals were calculated with 95% confidence.

## RESULTS

The survey was sent to 141 people; the response rate was 69%. The group with the highest participation was nursing, with 30% of the total respondents, followed by pediatric surgeons (27%), and other medical staff (27%), and pediatric anesthesiologists (16%, [Figure 1](#)). Of the total number of responses, 68% were women and 32% were men. The average age was 42.3 ± 10.6 years. The demographic data for each group are shown in [Table 1](#).

### Answers to the survey sent to the healthcare staff

[Table 2](#) shows the percentages of promoters, detractors and passive respondents as well as the NPS results. [Table 3](#) shows the percentage of promoters in each group for each question and the comparative analysis of group responses. Questions rated positive for PPIA had NPS values > 50 (excellent service quality), except for the question "PPIA decreases use of presurgical medication" which had an NPS of between 0 and 50 (good service quality), meaning that 100% of respondents agreed fully and agreed with the positive aspects of PPIA. On the other hand, all questions considered negative for PPIA had a negative NPS (poor quality of service), meaning that the respondents all disagreed that PPIA has negative aspects for the patients, their families, and for the development of surgical care activities. Comparing the results by group, statistically significant differences were found only for the question "PPIA increases patient safety," with a lower percentage of pediatric surgeons who think that PPIA increases patient safety, compared with anesthesiologists (69.6% vs 90%), nurses (69.6% vs 92%), and other medical staff (69.6% vs 90% vs 96%, *P* = 0.037).

## DISCUSSION

The results of our survey showed full approval of the implementation of the PPIA program at our center. The intervention was considered by pediatric surgeons, anesthesiologists, nurses, and other medical staff as an excellent quality service by more than 80% of the respondents. This conclusion is in line with other recent studies that showed that pediatric surgery departments and other healthcare providers approved of PPIA and consider it beneficial for the patient[7,12]. To our best knowledge, this is the first study to investigate whether sex and age were possible conditioning factors in answering this type of survey. According to our results, women were more prone to respond than men, but we did not find any differences regarding the age of the respondents. That finding might be explained by the higher percentage of women in the group with more survey participants (93% women vs 7% men), and not as a factor involved in support or resistance to PPIA.

We launched the project because we consider the presence of parents during anesthetic induction as part of a comprehensive, family-centered approach that respects their requirements and decisions. That was not always the case in pediatric healthcare. In 1895 D'Arcy Power wrote: "When an operation has been decided upon,

**Table 1 Demographic data of each group**

	Pediatric surgeons	Pediatric anesthesiologists	Nursing	Other medical staff	P value
Age, yr	40.8 ± 11.5	43 ± 8.5	41.7 ± 9.8	44.2 ± 11.7	0.56
Age subgroups, yr					
< 50	70	83	79	73	0.77
> 50	30	17	21	27	
Gender					
Male	46	44	7	38	0.006
Female	54	56	93	62	

Data are means ± SD or percentages.

**Table 2 Percentages of promoters, retractors, and passive responses in each group for each question and the Net Promoter Score (promoters – retractors) for each question**

Survey question	Promoters	Retractors	Passive	NPS (promoters – retractors)
Positive for PPIA				
PPIA improves the child’s surgical experience	83.5	13.4	3.1	70.1
PPIA improves the parent’s surgical experience	81.4	6.2	12.4	75.2
PPIA improves the relationship of the patient and his/her environment with health professionals at all levels	81.4	4.2	14.4	77.2
PPIA increases parental satisfaction	82.5	3	14.4	79.5
PPIA increases patient safety	71.1	11.3	17.5	59.8
PPIA decreases the use of presurgical medication	47.4	19.6	33	27.8
Negative for PPIA				
PPIA decreases surgical efficiency	5.1	71.1	23.7	-66
PPIA should be exclusive por patients in ambulatory surgery	12.4	71.1	6.2	-58.7
PPIA increases parental anxiety	23.7	54.6	21.6	-30.9
PPIA increases child’s anxiety	3.1	86.6	10.3	-83.5
PPIA increases the duration of anesthetic induction	16.5	54.6	28.8	-38.1
PPIA increases the number of infections	4.1	63.9	32	-59.8
PPIA increases the cost of health care	20.6	59.8	19.6	-39.2
PPIA increases fear of legal problems	24.7	52.6	23.7	-27.9

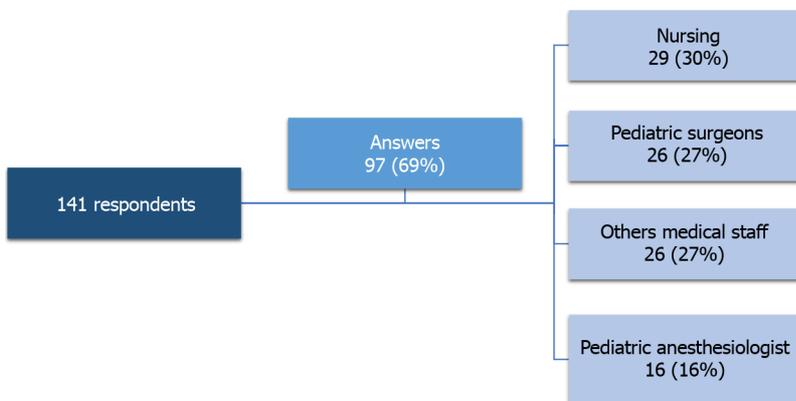
NPS: Net Promoter Score; PPIA: Parental presence at anesthetic induction.

it will generally be seen that better results are obtained if the child is removed from his usual environment and placed in the care of those who have special experience in the care of sick children”[13]. The idea of separating the pediatric surgical patient from the family environment was maintained during the first half of the 20th century. Later, Gross[14] and Caniano *et al*[15] emphasized and assumed the role of the family in the child’s surgical experience. It has been in recent decades that PFCC has grown and evolved to become a goal to be achieved in all medical areas including pediatric surgery[8]. Participation and collaboration are the basic concepts of PFCC, and numerous studies have tested strategies such as preoperative family preparation or the impact of the PPIA. The data on family preparation for the reduction of preoperative anxiety are positive[16,17]; in contrast, the results obtained regarding the impact of PPIA are controversial and not clear, as the latest Cochrane review showed[5]. However, even though Sadeghi *et al*[18] and Hussain and Khan[19] found no benefit of

**Table 3 Percentage of promoters in each group for each question and comparative analysis by group**

Survey question	Pediatric surgeons	Pediatric anesthesiologist	Nursing	Other medical staff	P value
Positive for PPIA					
PPIA improves the child’s surgical experience	95	100	92	100	0.36
PPIA improves the parent’s surgical experience	83	100	92	100	0.07
PPIA improves the relationship of the patient and his/her environment with health professionals at all levels	86	100	96	100	0.11
PPIA increases parental satisfaction	85	100	100	96	0.07
PPIA increases patient safety	70	90	92	96	$P < 0.05$
PPIA decreases the use of presurgical medication	62	80	55	88	0.11
Negative for PPIA					
PPIA decreases surgical efficiency	12	8	0	12	0.45
PPIA should be exclusive por patients in ambulatory surgery	13	23	8.3	22	0.52
PPIA increases parental anxiety	38	31	36	14	0.27
PPIA increases child’s anxiety	0	0	7	3	0.45
PPIA increases the duration of anesthetic induction	29	21	23	22	0.94
PPIA increases the number of infections	5	10	11	11	0.91
PPIA increases the cost of health care	19	25	36	19	0.50
PPIA increases fear of legal problems	37	21.4	37	32	0.77

PPIA: Parental presence at anesthetic induction.



**Figure 1 Survey participants.** Ninety-seven of 141 healthcare workers who were sent the survey (69%) returned it with answers. The total number of participants and total number of participants in each group are shown.

PPIA with respect to preoperative anxiety, they did find other positive aspects, such as improved patient cooperation at the time of anesthetic induction, better acceptance of the face mask, or increased parental satisfaction, suggesting that PPIA may improve those aspects. In line with those findings, we found that the group with the highest percentage of promoters in most of the positive questions for PPIA was pediatric anesthesiologists, probably because behavior of children during anesthetic induction was better when a parent was present. However, Luehmann *et al*[7], showed that the median response to PPIA was most favorable for perioperative nurses, who are involved in all aspects of patient care and can give a more comprehensive opinion. The findings reinforce the support to the program from different points of view of the same process.

Many prejudices had to be overcome before the project could be launched. There are still common points of contention against this measure on the part of the medical staff, who believe that the presence of the parents could be disturbing, the induction of anesthesia and surgical intervention delayed, and the possibility of generating medical-legal problems. For example, Paice *et al*[6] reported significantly less support from medical staff for the presence of parents during invasive procedures compared with parents. In our results, pediatric surgeons were less positive than other groups when asked whether PPIA increased patient safety, which could be explained by fear of unwanted events. However, no related adverse effects were found in other studies, and there are no valid arguments to justify medical staff resistance to the implementation of this measure.

Unfortunately, despite the rationale and supporting evidence, PPIA is far from being a widespread and applicable procedure for all surgical procedures and invasive testing. Pediatric surgery has changed enormously over the last century, and we believe that family involvement in day-to-day clinical practice will eventually become a well-established part of pediatric surgical patient care. Finally, the acceptance and commitment of the healthcare personnel in the application of the PPIA at our center is highlighted. We suggest that all surgical centers should have programs that include family involvement, such as parental presence at anesthetic induction.

### **Limitations**

Our study has the typical limitations of a qualitative survey. We cannot draw objective conclusions that can be tested if we do not offer an in-depth understanding of the acceptance of PPIA at our center with the belief in its expansion to other centers. Although we included the sex and age of respondents, other influential factors such as years of experience or previous experience with PPIA programs were not included in the analysis. We also did not take passive responses into account, assuming that they would not be relevant to the results. Finally, we are aware of the difficulty of applying a quality score from the business world to a measure of preoperative anxiety, but we believe in it here.

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## **CONCLUSION**

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The results highlight the acceptance and commitment of healthcare personnel in the application of the PPIA in our center. We suggest that all surgical centers should have programs that include family involvement, such as parental presence at anesthesia induction.

## **ARTICLE HIGHLIGHTS**

### **Research background**

Medicine is getting closer and closer to the human side of the patient and family. Family knowledge, understanding, and accompanying their children, offers them an opportunity to contribute in the surgical process, and helps to reduce the stress caused by those situations.

### **Research motivation**

We were motivated by the importance of avoiding the anxiety and stress that a surgical intervention causes in pediatric patients and their family environment, improving our relationship with them, and promoting their welfare.

### **Research objectives**

The objective was to analyze the responses of healthcare workers to the implementation of a program in which parents accompany their children to the operating room to mitigate and reduce the anxiety and stress produced in the patient and their family environment by surgical interventions.

### **Research methods**

A survey was designed and sent to the personnel involved in the process. It was analyzed and reinterpreted by applying a novel "Net Promoter Score".

**Research results**

The personnel involved in the process support the implementation of the program

**Research conclusions**

Based on the good acceptance of the program in our center, we suggest the development and implementation of the program by other centers.

**Research perspectives**

More studies are needed to demonstrate the effectiveness of parental presence during the induction of anesthesia (PPIA) and the support of healthcare workers for measures such as PPIA or similar programs. We must demonstrate the importance and involvement in achieving patient and patient- and family-centered care as one of the goals of present and future medicine.

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