

Parental anxiety and stress before pediatric anesthesia: A pilot study on the effectiveness of preoperative clown intervention

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Abstract

As induction of pediatric anesthesia can elicit anxiety in children and parents alike, this study was aimed at evaluating the effectiveness of clown intervention in decreasing maternal anxiety and stress in the preoperative phase. Before anesthesia induction, 25 children were randomly assigned to clown intervention and 25 to a control group with a routine procedure. In the waiting room and after separation from the child, maternal anxiety and stress were measured. The results showed that after separation, only in the clown group, maternal state anxiety significantly decreased and the tendency to somatization did not increase. Moreover, after clown intervention, older children's mothers significantly reduced the level of perceived stress. As clown intervention can positively influence maternal anxiety and stress in the preoperative period, its promotion in clinical–hospital environments is recommended.

Keywords

child age, clown intervention, maternal anxiety, maternal stress, pediatric anesthesia

Introduction

A considerable amount of evidence exists on the significant distress and anxiety that children experience during the preoperative period, even in case of minor day surgery (Fortier et al., 2010; Kain et al., 1996, 2006; Kotiniemi et al., 1997; Wright et al., 2007).

The induction of anesthesia can, in fact, be a frightening, incomprehensible event for children, as it represents an unknown situation; before surgery, up to 75 percent of children undergoing anesthesia experienced severe anxiety or distress (Kain et al., 1996) that is often

associated with crying, fear of separation, fussiness, and anger or freezing. Besides, pediatric anesthesia can be linked to postoperative maladaptive behaviors and to possible negative consequences on the child's long-term development

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(Caldas et al., 2004; Kain et al., 2004b; Vagnoli et al., 2005; Wennstrom et al., 2008).

For these reasons, preoperative preparation of pediatric patients and their environment is an important issue in pediatric anesthesia (Astuto et al., 2006), and a large number of studies have assessed the effectiveness of the techniques used to reduce preoperative anxiety and to support postoperative awakening. Regarding this, midazolam, the most commonly used pharmaceutical technique, has proved effective (Calipel et al., 2005; Kain et al., 2004a); however, several authors (Watson and Visram, 2003) suggest avoiding the use of pharmaceutical sedation, when not in the presence of severe stress and agitation, because of its side effects, of the possibility of affecting the children's postoperative functioning (McGraw and Kendrick, 1998) and because of a longer stay in hospital (Viitanen et al., 1999).

As a consequence, particular attention has been paid to nonpharmacological methods used to reduce the child's anxiety and distress in this specific moment. These techniques are quite different (Wright et al., 2007), but can be divided into two main categories: the first one related to intervention trials on the child and the second one related to intervention trials on parents.

As to the former, the literature includes studies on the effectiveness of video games (Patel et al., 2006), hypnosis (Calipel et al., 2005), low sensory stimulation (Kain et al., 2001), music therapy (Kain et al., 2004a), and clown doctors (Fernandes and Arriaga, 2010; Golan et al., 2009; Hansen et al., 2011; Meisel et al., 2009; Vagnoli et al., 2005, 2007, 2010). The results from these studies are very heterogeneous and inconclusive; for example, midazolam has proved more effective than music therapy in counteracting preoperative anxiety (Kain et al., 2004a), but less effective than hypnosis and video games (Calipel et al., 2005; Patel et al., 2006). Moreover, children were more likely to be cooperative during induction in a low sensory stimulation group (Kain et al., 2001). Up to now, it has not been possible to have a clear overview

on the effectiveness of nonpharmacological methods versus pharmacological ones; besides, promising nonpharmacological interventions such as hypnotherapy and hand-held video games need to be investigated further.

However, among these techniques, one that has recently been experimented in pediatric anesthesia with very promising results is the presence of clown doctors in hospitals. Clown doctors, in most cases, are professional performing artists, with a specific training, who dress as doctors.

The implementation of techniques such as clown doctors can have several beneficial effects on the child. Even though the research documenting the benefits of humor and laughter in clinical populations is still at a preliminary stage and it is difficult to determine how they may relate to any specific disease process, humor and laughter have yielded beneficial effects, working at many different levels: they can relax muscles, improve circulation, improve the production of natural painkillers (beta-endorphins), and lower the production of cortisol, thus strengthening the immune system (Bennett and Lengacher, 2006, 2008; Fry, 1992; Martin and Dobbin, 1988). The physiological correlates associated with humor represent, therefore, an important factor in determining the quality of life and well-being and in mediating the perception of a condition of illness in the physiological mechanisms of the human body (Martin, 2001).

With respect to the reduction of child anxiety, many studies (Fernandes and Arriaga, 2010; Golan et al., 2009; Vagnoli et al., 2005, 2007, 2010) have identified clown intervention as an effective source of psychoemotional support for children undergoing minor surgery, showing that the possibility to play, even in a hospital ward, is effective in reducing the levels of preoperative anxiety.

Nonpharmacological methods to reduce child anxiety that are addressed to parents primarily focus on their presence during anesthesia induction (Kain et al., 2003; Messeri et al., 2004; Palermo et al., 2000), as parental presence

could effectively minimize child distress and anxiety.

However, while some studies suggest that parental presence during anesthesia induction does decrease the level of child distress and anxiety and also improves his or her cooperation (Amanor-Boadu, 2002; Cameron et al., 1996; Wright et al., 2010), others have underlined that midazolam was significantly more effective on child anxiety than parental presence (Arai et al., 2007; Kain et al., 1998, 2007a); furthermore, it has been verified how the combined effect of midazolam plus parental presence or hand-held video games plus parental presence had better effects on child anxiety than parental presence or midazolam alone (Kain et al., 2000, 2003; Patel et al., 2006). On the whole, comparisons between parental presence *and* parental absence have showed no relevant differences in children's anxiety or cooperation on entering the induction area or during induction itself (Bevan et al., 1990; Kain et al., 1996, 1998, 2007a; Palermo et al., 2000).

One plausible explanation of this is the possibility that anxious parents, when present, may contribute to transmit anxiety to the child (Thompson et al., 1996). To this end, increased evidence in the literature shows that pediatric anesthesia can represent a stressful event for parents alike, who might feel helpless and concerned (Chundamala et al., 2009; O'Conner-Von, 2000; Vagnoli et al., 2010), and show—especially in the preoperative phase—*anxious behavior that may directly influence their child's preoperative anxiety* (Bevan et al., 1990; Fortier et al., 2010; Kain et al., 1996). This relationship can be particularly strong when the child's age is considered, and this is in line with the framework of *Developmental psychology*: the intense stressful situation represented by the surgery elicits different responses in children, depending on their level of cognitive, social, emotional, and personality maturity, and younger ones generally show greater suffering, also linked to the separation from the family (Patel et al., 2006; Small, 2002). This can explain why, the younger the children are, the higher

the level of anxiety parents can experience. For this reasons, the child's age should be included as a moderator of the relation between child and parental anxiety.

Two recent reviews (Chundamala et al., 2009; Yip et al., 2010) evaluating the effects of parental presence compared to other conditions (i.e. pharmacological treatment and video games intervention) have showed an agreement in concluding that generally parental presence during anesthesia induction does not seem to significantly reduce neither child nor parental anxiety.

More generally, in a developmental perspective, this issue arises the critical role played by the interactions between the child and his caregivers for the child development. Caregivers who interact in a supportive way help the child to negotiate and pass through main developmental stages, to deal with a wide range of emotions, and to adapt to stressful situations. But interactions with anxious and worried parents, especially in the context of relevant emotional experiences (such as separations and hospitalizations), can inhibit child's self-confidence and adaptation (PDM Task Force, 2006). For instance, Messeri et al. (2004) clearly evidenced how, in the context of child's anesthesia induction, the parents with both high levels of situational anxiety (state anxiety) and baseline anxiety (trait anxiety) conveyed their anxiety to their child and made the child more stressed.

In the light of these results and in consideration that parental presence is a constant element or factor in the daily routine of health care and hospital staff involved in child surgery, interventions aimed at reducing parental anxiety could be considered a useful strategy to prevent child negative outcomes. Notwithstanding, up to now, only a few studies have analyzed the effects of nonpharmacological methods on parental anxiety, and this represents a considerable lack in the literature (Yip et al., 2010).

For example, few studies have considered a variety of preoperative preparation programs addressed to parents, such as an operating area tour, or peer modeling preparation by means of videos, puppets, or cartoons; however, up to

now, results have not been exhaustive (Cassady et al., 1999; Hatava et al., 2000; Kain et al., 1998, 2007b). A recent preparation program, the family-centered preoperative ADVANCE preparation program, proved effective in reducing preoperative anxiety and improving postoperative outcomes (McEwen et al., 2007). Fincher et al. (2012) used a standardized preoperative preparation program that gave information to parents by means of a photo file, which depicted the sequence of events, and a tour of the preoperative room. This program effectively reduced parental anxiety in the preoperative period, even though it did not reduce child anxiety; no differences emerged as to postoperative effects. Wang et al. (2004) focused their intervention on parents comparing a condition with anxiety-reduction acupuncture to a condition with sham acupuncture: parents in the first group and their children significantly decreased the level of anxiety.

Another potential nonpharmacological method to reduce parental anxiety that has been used in few studies is clown intervention. Fernandes and Arriaga (2010) found a significant decrease of parental state anxiety after clown intervention, while in two Italian studies no differences emerged neither in state nor in trait anxiety after clown intervention (Vagnoli et al., 2005, 2010). Specifically, Vagnoli et al. (2010) evidenced how a high level of anxiety experienced by parents was strongly associated with a child's younger age.

Considering the promising effects of clown doctors on child anxiety and the need to further investigate on their effects on parental anxiety, the general aim of the current study was to explore whether clown intervention can be effective in decreasing the levels of parental anxiety in the preoperative phase. The starting assumption was that child anxiety is strictly dependent on parental anxiety; therefore, decreasing the latter might possibly lead to low preoperative anxiety and more collaborative behavior from children undergoing minor surgery. Therefore, our hypothesis was that clown intervention could be effective in reducing parental anxiety. The child's age was included in order to take into account the relevance

of child's developmental level, to explore any possible relation with parental anxiety, and to describe any specific effect of the clown intervention. Besides, in order to better explore the potential effects of clown intervention on parental emotional state, we included a measurement of stress, other than anxiety, hypothesizing that clown intervention could be effective in decreasing the level of perceived stress.

According to Lazarus and Folkman's (1984) stress and coping framework, people evaluate an event as stressful based on how much it threatens them and how able they are to mobilize resources or coping options. The perception of stress is the result of the action of three kinds of factors: subjective perception, objective characteristics of the stimulus, and the evaluation of own resources and coping skills.

Especially, coping is a relevant part of the recent literature on health psychology (Donovan-Kicken and Caughlin, 2011; Kraaji et al., 2009; Litman and Lunsford, 2009; Ngai et al., 2012) and refers to cognitive and behavioral efforts and strategies to tolerate or reduce external and internal demands and conflicts among them; therefore, the adaptation to a stressor is strongly associated with how the individual copes. Considering this, parental coping skills can play a relevant role for the perception of stress in the situation of pediatric anesthesia, with possible consequences on child adaptation (Kain et al., 2003; McGraw, 1994). Despite that, in the literature, a minor attention has been paid to the investigation of the effects of pediatric anesthesia on parents' level of stress (Vessey et al., 1994). For these reasons, in order to improve the understanding on parental emotional reactions during child's induction of anesthesia, we included in our study the evaluations of both parental anxiety and stress.

Method

Participants

All consecutive pediatric patients scheduled to undergo general anesthesia for minor day

surgery (e.g. intestinal biopsy, removal of adenoids, or tonsils) at Bufalini Hospital in Cesena (Italy) were considered for eligibility in the study. The inclusion criteria were as follows: Italian nationality (to avoid any misinterpretation of the instruments used), residence in the town or close to it, American Society of Anesthesiology physical statuses I and II, absence of prematurity and developmental delay, and absence of chronic illness.

A total of 50 children, between 3 and 12 years of age ($M = 5.18$, standard deviation (SD) = 2.73), admitted to the hospital, and their respective mothers were recruited for the research. Fathers were not included in this study because the frequency of their presence at Day Hospital (DH) was irregular (on the total sample recruited only 13 fathers were present). The study protocol was approved by the Hospital Ethic Committee, and written informed consent was obtained from all the mothers included in the study.

Measures

All mothers completed a questionnaire on the following sociodemographic information: the child's age and gender, the child's illness or diagnosis (if present), the mother's age, their level of education, their marital status, and their socioeconomic status.

For the assessment of maternal levels of anxiety and distress, the mothers completed two specific self-report measures. The first one was the *State and Trait Anxiety Inventory* (STAI; Spielberger, 1983; Italian version by Pedrabissi and Santinello, 1989); this self-report measure is divided into two scales, measuring state (STAI Y-1) and trait (STAI Y-2) anxieties, each consisting of 20 items. Each item is scored on a 4-point scale, and the total score can range between a minimum of 20, indicating that the subject feels no anxiety at all, and a maximum of 80, evidencing a high level of anxiety. The clinical range for high-risk mothers is set at 41 or higher in the Italian version. The scale showed high internal consistency in the

normative sample (0.91–0.95); in the present sample, Cronbach's alphas for STAI were 0.92 (state anxiety) and 0.93 (trait anxiety). For the present study, both state and trait anxiety scores were used as we were interested in both evaluating any possible change in the level of state anxiety and controlling whether trait anxiety did not change over time.

The second instrument used was the *Rapid Stress Assessment Scale* (VRS; Tarsitani and Biondi, 1999); VRS was created for the self-evaluation and perception of one's reactions to a stressful event or situation. In the present study, it was considered suitable to assess the possible parental stressful reactions to their child's surgery. This self-report measure is very quick (15 items), and it is based on the stress model proposed by Lazarus and Folkman (1984), which evaluates the response to stress in different psychopathologic dimensions; specifically, VRS includes five subscales: Anxiety, Depression, Somatization, Aggressiveness, and Lack of social support. Each item is scored on a 4-point scale (ranging from 0 to 3), and the total score ranges between 0 and 45, with 0 indicating a situation of well-being, where the individual does not feel exposed to particularly stressful events, and 45 indicating that he or she is experiencing a very stressful reaction to a situation. In the present sample, Cronbach's alpha for VRS was 0.81. In the present study, we were interested in evaluating the stressful reaction to child surgery and any possible anxious response, so we specifically focused on the VRS total score and on the Anxiety and Somatization subscales.

Procedures

All subjects underwent the same hospital standard procedures, according to which the family and the child arrive at the Pediatric DH and sit in a waiting room, before the child is taken to the operating room.

In relation to the research design, the parents and the children were contacted by an expert psychologist when they arrived at the hospital;

the mothers who consented to participate in the study were asked to sign an informed consent form along with one on the management of personal information; in the waiting room, the mothers were then administered two self-report instruments (baseline) and were informed that later they would be asked to complete the tests again.

The families recruited for the study were randomly assigned to (1) an experimental group subject to clown intervention ($n = 25$), in which children interacted with clowns in the waiting room; in this condition, once the tests were completed, the clowns entered the waiting room and started playing with the child, staying with him or her for about 30 minutes; (2) a control group with a routine procedure ($n = 25$), in which children and their mothers stayed in the waiting room without clowns for the same period of time as the experimental group.

In both groups, the instructions given and the sequences of questionnaires were identical. The study was presented to all mothers asking whether they were interested to participate in a study investigating their emotional reactions to child's surgery. It was also explained that this was a preliminary project for the realization of future studies on the evaluation of techniques and interventions aimed at reducing family's negative emotions around child's surgery.

As clown doctors were present at the hospital in specific days, the assignment to index or control group depended on the hospital timetabled admission service. As a consequence, the control and intervention participants never interacted with each other.

The clown intervention was aimed at distracting and entertaining children, by means of different activities and toys, such as magic tricks, soap bubbles, music, and puppets. Each method was used according to the child's age. The clowns' humor and actions were directed at involving not only the child but also the mother in the "playing" atmosphere.

Afterward, each child in the clown group was accompanied by a nurse, his or her mother, and the clowns to the operating room; here, all

the adults stayed during the induction of anesthesia. For the control group, the procedure and the timing were the same, the only difference being that the clowns were never present, and the child was accompanied to the operating room by a nurse and his or her mother. Maternal anxiety and distress were assessed again immediately after the separation of the mother from the child.

Data analyses

Power analysis was run in order to evaluate the adequate size of the sample. In order to obtain a statistical power of 80 percent in the study, we needed to enroll a minimum of 2×23 subjects to detect significant differences between groups.

First, the differences between the index and the control groups, regarding sociodemographic variables, were analyzed through Pearson's chi-squared test, Fisher's exact test, and independent samples t test. Second, mixed ANOVAs were carried out to explore a possible effect of the interaction between the "Group" (Clown or Control) and the "Time" (for the mother: waiting room/after separation) variables on the scores of STAI Y-1, STAI Y-2, and VRS. Besides, as to the children's age range (3–12 years), we divided the subjects into two age groups (3–5 years and 6–12 years; $n = 30$ and $n = 20$, respectively) and included "Child age" as an independent variable in mixed ANOVAs. Significant results were considered when p values were lower than 0.05. Statistical analyses were carried out using the SPSS statistical software for Windows (version 20.0).

Results

Characteristics of the sample

The sociodemographic characteristics were similar between the two groups (see Table 1); they were in fact comparable with reference to the distribution of the children's gender (Fisher's exact test, $p = 1.00$), the children's age ($t(49) = 0.89, p = 0.38$), the children's age range (Fisher's

Table 1. Sociodemographic characteristics of the sample.

	Clown group (N = 25)	Control group (N = 25)
Child		
Gender, male (%)	52.0	48.0
Mean age (in years), mean \pm SD	5.53 \pm 3.34	4.84 \pm 1.95
Age range (%)		
3–5 years	60.0	60.0
6–12 years	40.0	40.0
Mother		
Mean age (in years), mean \pm SD	36.45 \pm 5.71	35.95 \pm 3.99
Education (%)		
Middle school certificate	28.6	26.3
High school diploma	57.1	63.2
University degree	14.3	10.5
Socioeconomic status (%)		
High	20.0	13.3
Medium	60.0	60.0
Low	20.0	26.7

SD: standard deviation.

exact test, $p = 1.00$), the mothers' age ($t(49) = -0.33$, $p = 0.74$), their education ($\chi^2_{[2]} = 0.19$, $p = 0.91$), and their socioeconomic status ($\chi^2_{[2]} = 0.34$, $p = 0.84$). In both groups, all mothers were married.

Maternal state and trait anxiety

The mothers' state and trait anxiety were measured at baseline and after separation from the child. The means and standard deviations for both the assessments are shown in Table 2.

The results showed that state anxiety scores (STAI Y-1) significantly changed over time. In fact, there was a significant main effect related to the variable Time ($F(1, 48) = 32.91$, $p = 0.0001$, $\eta^2_p = 0.42$), which revealed a significant decrease from the first assessment to the second assessment (waiting room: $M = 44.90$, $SD = 11.50$; separation: $M = 36.90$, $SD = 8.27$). No relevant effects linked to the Group and Child age variables were detected ($p = 0.34$ and 0.54 , respectively), nor significant differences related to Time \times Group ($p = 0.61$), Time \times Child age ($p = 0.17$), and Group \times Child age ($p = 0.62$)

interactions and the three-way interaction ($p = 0.23$) were noted.

As to trait anxiety scores (STAI Y-2), no main effects emerged for Time ($p = 0.14$), Group ($p = 0.35$), and Child age ($p = 0.86$) variables, and none of the possible interactions among all factors resulted significant (all p values > 0.05).

When considering the categorical scores of STAI related to state anxiety, only in the Clown group, there was a significant decrease (McNemar test, $p = 0.004$) in the number of mothers showing high anxiety compared to the number of women becoming anxious (9 vs 0), while in the control group, there was not any significant change (5 vs 1, McNemar test, $p = 0.22$; see Table 3). As regards trait anxiety scores, no significant tendencies toward recovery or worsening emerged in the control ($p = 0.62$) and clown groups ($p = 0.50$; see Table 3).

Maternal responses to the stressful situation

First, when we considered VRS–Anxiety scores, significant results for “Time \times Group” interaction

Table 2. Means and standard deviations of mother's and child's self-report measures.

Measures	Group		Child age		F				
	Clown (N = 25)	Control (N = 25)	3-5 years (N = 30)		Group	Child age	Time	Group × Child age	Group × Time
			6-12 years (N = 20)	32.9 ± 8.39					
STAI Y-1									
Waiting room	43.76 ± 11.45	46.04 ± 11.67	37 ± 9.24	32.9 ± 8.39	0.93	0.38	32.91**	0.26	0.27
After separation	35.36 ± 8.96	38.44 ± 7.37	38.33 ± 8.38	34.75 ± 7.82					
STAI Y-2									
Waiting room	35.84 ± 8.38	38.68 ± 7.89	37.63 ± 9.36	36.7 ± 6.2	0.90	0.03	2.25	2.14	0.15
After separation	34.8 ± 9.68	38.04 ± 8.55	36.4 ± 10.24	36.5 ± 7.58					
VRS-Anxiety									
Waiting room	2.56 ± 1.63	3.08 ± 1.85	2.77 ± 1.65	2.9 ± 1.92	3.70	0.02	3.81	0.13	7.19*
After separation	1.8 ± 1.66	3.2 ± 1.87	2.6 ± 1.87	2.35 ± 1.95					
VRS-Somatization									
Waiting room	2.6 ± 2.18	2.64 ± 1.91	2.77 ± 2.18	2.4 ± 1.82	0.26	0.65	0.46	4.51*	4.50*
After separation	2.32 ± 2.01	3.2 ± 1.35	2.93 ± 1.89	2.5 ± 1.54					
VRS-Total score									
Waiting room	11.89 ± 5.43	14 ± 6.67	13.03 ± 6.77	12.8 ± 5.14	2.42	0.26	15.83**	5.96*	4.12*
After separation	8.72 ± 5.37	12.6 ± 5.42	11.17 ± 6	9.9 ± 5.24					

VRS: Rapid Stress Assessment Scale; STAI: State and Trait Anxiety Inventory.

* $p < 0.05$; ** $p < 0.0001$.

Table 3. Stability and change over time in state and trait anxiety.

	No change		Change		<i>p</i>
	Low anxiety	High anxiety	Recovery	Worsening	
State anxiety					
Clown group (<i>N</i> = 25)	10	6	9	0	0.004
Control group (<i>N</i> = 25)	9	10	5	1	0.22
Trait anxiety					
Clown group (<i>N</i> = 25)	19	4	0	2	0.50
Control group (<i>N</i> = 25)	15	6	1	3	0.62

“No change” refers to subjects showing stability (low or high anxiety) at both assessments. “Change” refers to subjects showing a change in their level of anxiety at the second assessment; this can be in the direction of a recovery or worsening.

emerged ($F(1, 48) = 7.19, p = 0.01, \eta^2_p = 0.14$): only for the Clown group, mean scores significantly decreased from the first assessment to the second assessment (see Figure 1). No significant main effects emerged with relation to Time ($p = 0.06$), Group ($p = 0.06$), and Child age ($p = 0.09$) variables, nor with relation to any other interaction among all factors (all p values > 0.05).

VRS–Somatization scores showed significant results related to “Time \times Group” interaction ($F(1, 48) = 4.50, p = 0.04, \eta^2_p = 0.09$)—as only in the Control group, the scores significantly increased over time, revealing the mothers’ tendency to somatize more than the Clown

group (see Figure 1)—and related to “Child age \times Group” interaction ($F(1, 48) = 4.51, p = 0.03$), where younger children’s mothers in the Control group showed an evident tendency to somatize (Control group: 3–5 years, $M = 3.50 \pm 0.44$; 6–12 years, $M = 2.11 \pm 0.54$; Clown group: 3–5 years, $M = 2.20 \pm 0.44$; 6–12 years, $M = 2.85 \pm 0.52$). No significant results emerged in relation to Time ($p = 0.50$), Group ($p = 0.62$), and Child age ($p = 0.42$) variables and other possible interactions among factors (all p values > 0.05).

VRS–Total scores showed different significant results in relation to main effects and interactions among factors. Considering only

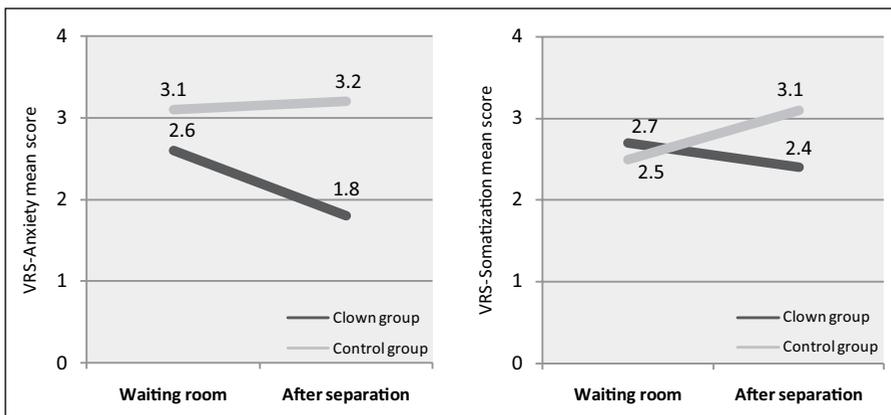


Figure 1. VRS–Anxiety and Somatization mean scores related to Time and Group variables. VRS: Rapid Stress Assessment Scale.

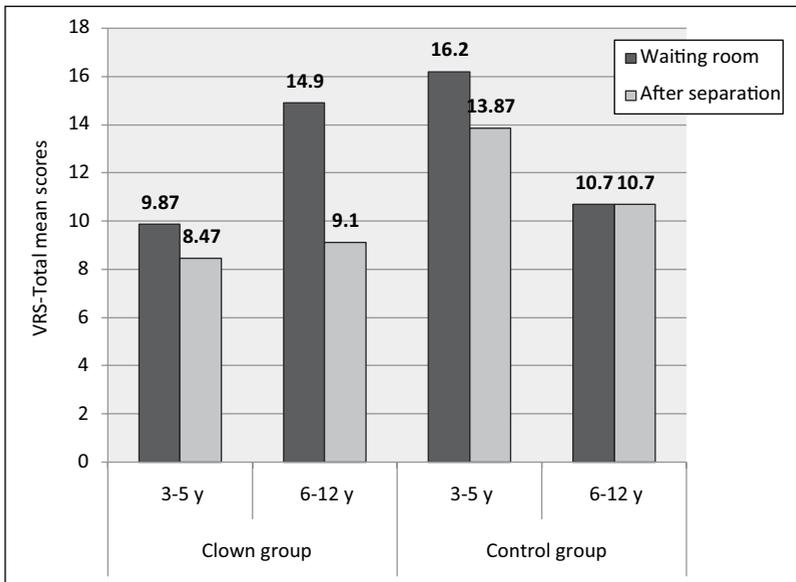


Figure 2. VRS–Total scores related to Time and Child age variables.
VRS: Rapid Stress Assessment Scale.

the results with higher observed power, a main effect emerged for Time variable ($F(1, 48) = 15.83, p = 0.0001, \eta^2_p = 0.26$), as VRS scores globally decreased at the second assessment compared to the first one (waiting room: $M = 12.94, SD = 6.11$; after separation: $M = 10.67, SD = 5.68$). Besides, a significant Time \times Group \times Child age interaction was found ($F(1, 48) = 7.89, p = 0.007, \eta^2_p = 0.15$), as in the Clown group older children's mothers showed a significant decrease in their levels of stress, compared to younger children's mothers, whereas in the Control group younger children's and older children's mothers showed similar values and a tendency to stability over time (see Figure 2).

Discussion

This study aimed at analyzing the possible beneficial effects of clown intervention on maternal anxiety and distress during the child's preoperative period. Clown intervention has been shown to be effective in reducing child's preoperative anxiety and negative emotional states and in improving postoperative adaptation (Fernandes

and Arriaga, 2010; Golan et al., 2009; Vagnoli et al., 2005, 2007, 2010), but its effects on parents' emotional states still are not clear.

Given the relevance of the assumptions emphasizing how parental stress and anxiety can be easily transmitted to the child (Bevan et al., 1990; Fortier et al., 2010; Kain et al., 1996) indirectly, we have considered the objectives of our study as a relevant topic in the area of pediatric anesthesia, which still needs to be further investigated.

Parental anxiety is a relevant matter to be taken into consideration by anesthetists and hospital staff especially when parents are present during the child's preoperative phase. Parental presence during the preoperative phase of child surgery has been extensively investigated as a potential helpful strategy to reduce child's preoperative anxiety (Amanor-Boadu, 2002; Bevan et al., 1990; Cameron et al., 1996; Kain et al., 1996, 1998, 2007a; Palermo et al., 2000; Wright et al., 2010); however, the Cochrane review by Yip et al. (2010) has stated that to promote low anxiety in the child during anesthesia induction, parental

presence should be considered on an individual patient basis, as there may be potential negative effects on the child due to high parental anxiety. Notwithstanding, in daily routine, parents are almost always present, and it is utterly difficult to restrain them from this, especially when they are anxious.

For this reason, this study primarily aimed at investigating whether clown intervention, already known in the literature and identified as an effective method to reduce child anxiety (Fernandes and Arriaga, 2010; Golan et al., 2009; Vagnoli et al., 2005, 2007, 2010), could have a beneficial effect also on parents. The previous literature investigating the potential positive effects of clown intervention on children has always given secondary relevance to the impact of the same technique on parents and has been strictly confined to the evaluation of parental anxiety. For these reasons, in this study, perceived stress was also investigated, in order to better describe mothers' negative emotional reactions to child's induction of anesthesia.

First, maternal state and trait anxiety were explored in this study. State anxiety scores showed a decrease over time independently from the Clown condition; in fact, it indicated anxiety to be higher upon arrival at DH and then to settle in all mothers. Nevertheless, it is worth highlighting that when considering categorical scores, only in the Clown group, a significant trend toward improvement was found, indicating a significant reduction in anxiety.

This result for STAI Y-1 categorical scores was confirmed by the VRS-Anxiety subscale, where overall the levels of anxiety visibly decreased at the second assessment only for the mothers in the Clown condition, while the control mothers maintained similar levels of anxiety over time. On the whole, these results on maternal anxiety would confirm the studies that found an evident reduction in parental anxiety after a Clown session (Fernandes and Arriaga, 2010), while they would not confirm the studies by Vagnoli et al. (2005, 2010), in which parental presence plus clown intervention reduced child

anxiety but not parental anxiety. The lack of evidence found in the abovementioned Italian studies may be due to the influence of different elements, among which a small sample size (Vagnoli et al., 2005), no categorization of STAI scores, and no use of other self-report measures other than STAI. Specifically, it is to remember that the choice of STAI as unique instrument to measure parents' anxiety could have led to a ceiling effect: considering that in the baseline assessment, mostly all the mothers showed high STAI scores; probably, the STAI was not sensitive enough to detect relevant differences between groups as result of the intervention variable.

As to trait anxiety, no differences were found, as expected, confirming that, as a stable element of personality, trait anxiety did not change in the situation investigated. This result was also similar in the studies by Vagnoli et al. (2005, 2010).

In regard to maternal levels of stress, it is important to underline that the present study represents—to our knowledge—the first one investigating other psychological constructs other than anxiety during the preoperative phase on which clown intervention could exercise its influence.

The Somatization subscale was considered quite relevant for the aims of our study, as it underlines the impact of a stressful situation on the mothers' possible physiological responses. A few studies have focused on the effects of clown intervention on the physiological responses of children in hospital (i.e. heart rate, respiratory frequency, electrodermal activity, and skin temperature), showing a positive effect on some of them (Bertini et al., 2011; Kingsnorth et al., 2011), while parental physiological responses have been directly measured in the studies by Kain et al. (1996, 2003), even if not in relation to clown intervention. The results showed that only the women in the control condition tended to increase their somatization over time, while the mothers after the clown intervention did not show relevant variations in their somatizing of stress.

In relation to the global measure of perceived stress, a relevant three-way interaction emerged: the positive effect of the clown intervention was evident for the oldest children's mothers (6–12 years), where a significant reduction in the global level of stress was found, while the oldest children's mothers in the control group maintained similar degrees of stress; no evident effects were found among the younger children's mothers in both conditions. This outcome would highlight an important characteristic of clown intervention, which has not been sufficiently defined up to now: its effectiveness on parents would be sensitive to child's age. Only one study (Meisel et al., 2009) showed a similar result and, more significantly, related to child outcome: the clown intervention was effective on the eldest children (9–13 years) but not on the youngest ones (3–8 years).

These data are relevant when considered in a developmental psychology framework, underlining the importance to evaluate the level of child maturity: in front of unknown and highly stressful situations, younger children (1–4 years) have poorer cognitive and emotional abilities, showing high levels of anxiety, also with relation to separation from the parents; because of the characteristics of their coping strategies, the presence of an adult is very important in order to promote support and reassurance (PDM Task Force, 2006). Children of 5 years and older have developed their mental processes to such an extent as to be able to better understand the situation, differentiating perceived reality from imagined one, dealing with negative emotions, and developing symbolic solutions; therefore, they cope better through behavioral and cognitive strategies, and their level of anxiety, including separation anxiety, is lower (PDM Task Force, 2006).

Considering this, we can hypothesize that in oldest children's mothers, the level of stress, even if high, is still lower when compared to younger children's mothers, so they would get more benefit from the intervention offered by the clown. For this reason, stratification of age should never be ignored and investigated deeply

in future research, as a relevant moderator for the effects of clown intervention. Generally, our results seem to show how, through the clowns' intervention, mothers can experience the preoperative period with a more favorable emotional state, represented by a significant decrease in anxiety and perceived stress.

The main methodological limitation of the present study is represented by its small sample size. This element reflects a limitation already found in other studies on the same topic (Bertini et al., 2011; Fernandes and Arriaga, 2010; Golan et al., 2009; Vagnoli et al., 2005, 2010), evidencing some difficulties in conducting this kind of research. The repetition of this study on wider samples would in fact be desirable, so as to possibly confirm the obtained results, considering also wider demographic characteristics. Moreover, the inclusion of objective physiological measures (e.g. heart rate and respiratory frequency) in mothers and of a long-term assessment of postoperative anxiety and stress, as in Meisel et al. (2009), might give more exhaustive results on the efficacy of the clown intervention. Furthermore, even if we only assessed mothers, future studies should include the fathers as well; previous results (Caumo et al., 2001; Kain et al., 2003; Messeri et al., 2004) evidenced how in similar situations mothers reported higher anxiety levels and appeared more reactive to stressors compared to fathers. For this reason, it would be desirable to confirm whether parental anxiety, with relation to being present during child's anesthesia induction, might be affected by a gender difference.

The overall results of the present study have useful implications for clinical practice. Chundamala et al. (2009), arguing on the advantages and disadvantages of parental presence during child anesthesia induction, stated: "What is best and safest for the child is the major deciding factor." Since family dynamics are important, however, the question remains, "Should we be treating parents as well, if the answer is yes, then how?" (p. 69).

Taking into consideration the common condition of parental presence during child anesthesia

induction, clown intervention can be promoted as a method that would aim both at minimizing the patient's and his or her family's stress during hospitalization and treatment and at building a work alliance with the medical and paramedical staff. In this way, the hospital, a place of care for the body, might also contain the emotional aspects of illness, favoring well-being as a whole.

The data, therefore, when confirmed on wider samples, are encouraging for the use and promotion of clown intervention in clinical-hospital environments, in order to limit the negative impact of anesthesia on pediatric patients' well-being and to promote a precocious normalization of negative emotional states in children and their mothers.

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References

- Amanor-Boadu SD (2002) The effect of parental presence at induction of anaesthesia on the behaviour of unседated Nigerian children presenting for day-case anaesthesia. *West African Journal of Medicine* 21(1): 28–30.
- Arai YC, Kandatsu N, Ito H, et al. (2007) Induction and emergence behavior of children undergoing general anesthesia correlates with maternal salivary amylase activity before the anesthesia. *Acta Anaesthesiologica Scandinavica* 52: 285–288.
- Astuto M, Rosano G, Rizzo G, et al. (2006) Preoperative parental information and parents' presence at induction of anaesthesia. *Minerva Anestesiologica* 72(6): 461–465.
- Bennett MP and Lengacher C (2006) Humor and laughter may influence health: II. Complementary therapies and humor in a clinical population. *Evidence-Based Complementary and Alternative Medicine* 3(2): 187–190.
- Bennett MP and Lengacher C (2008) Humor and laughter may influence health: III. Laughter and health outcomes. *Evidence-Based Complementary and Alternative Medicine* 5(1): 37–40.
- Bertini M, Isola E, Paolone G, et al. (2011) Clowns benefit children hospitalized for respiratory pathologies. *Evidence-Based Complementary and Alternative Medicine* 1–9. doi:10.1093/ecam/nea064
- Bevan JC, Johnston C, Haig MJ, et al. (1990) Preoperative parental anxiety predicts behavioural and emotional responses to induction of anaesthesia in children. *Canadian Journal of Anaesthesia* 37: 177–182.
- Caldas JC, Pais-Ribeiro JL and Carneiro SR (2004) General anesthesia, surgery and hospitalization in children and their effects upon cognitive, academic, emotional and sociobehavioral development: A review. *Paediatric Anaesthesia* 14: 910–915.
- Calipel S, Lucas-Polomeni MM, Wodey E, et al. (2005) Premedication in children: Hypnosis versus midazolam. *Paediatric Anaesthesia* 15(4): 275–281.
- Cameron JA, Bond MJ and Pointer SC (1996) Reducing the anxiety of children undergoing surgery: Parental presence during anaesthetic induction. *Journal of Paediatrics and Child Health* 32(1): 51–56.
- Cassady JF, Wysocki TT, Miller KM, et al. (1999) Use of a preanesthetic video for facilitation of parental education and anxiolysis before pediatric ambulatory surgery. *Anesthesia and Analgesia* 88(2): 246–250.
- Caumo W, Schmidt AP, Schneider CN, et al. (2001) Risk factors for preoperative anxiety in adults. *Acta Anaesthesiologica Scandinavica* 45(3): 298–307.
- Chundamala J, Wright JG and Kemp SM (2009) An evidence-based review of parental presence during anesthesia induction and parent/child anxiety. *Canadian Journal of Anaesthesia* 56(1): 57–70.
- Donovan-Kicken E and Caughlin JP (2011) Breast cancer patients' topic avoidance and psychological distress: The mediating role of coping. *Journal of Health Psychology* 16(4): 596–606.
- Fernandes SC and Arriaga P (2010) The effects of clown intervention on worries and emotional

- response in children undergoing surgery. *Journal of Health Psychology* 15(3): 405–415.
- Fincher W, Shaw J and Ramet AS (2012) The effectiveness of a standardised preoperative preparation in reducing child and parent anxiety: A single-blind randomised controlled trial. *Journal of Clinical Nursing* 21(7–8): 946–955.
- Fortier MA, Del Rosario AM, Martin SR, et al. (2010) Perioperative anxiety in children. *Paediatric Anaesthesia* 20: 318–322.
- Fry WF (1992) The physiologic effects of humor, mirth, and laughter. *JAMA* 267(13): 1857–1858.
- Golan G, Tighe P, Dobija N, et al. (2009) Clowns for the prevention of preoperative anxiety in children: A randomized controlled trial. *Paediatric Anaesthesia* 19(3): 262–266.
- Hansen LK, Kibaek M, Martinussen T, et al. (2011) Effect of a clown's presence at botulinum toxin injections in children: A randomized, prospective study. *Journal of Pain Research* 4: 297–300.
- Hatava P, Olsson GR and Lagerkranser M (2000) Preoperative psychological preparation for children undergoing ENT operations: A comparison of two methods. *Paediatric Anaesthesia* 10(5): 477–486.
- Kain ZN, Caldwell-Andrews AA, Krivutza DM, et al. (2004a) Interactive music therapy as a treatment for preoperative anxiety in children: A randomized controlled trial. *Anesthesia and Analgesia* 98(5): 1260–1266.
- Kain ZN, Caldwell-Andrews AA, Maranets I, et al. (2004b) Preoperative anxiety and emergence delirium and postoperative maladaptive behaviors. *Anesthesia and Analgesia* 99(6): 1648–1654.
- Kain ZN, Caldwell-Andrews AA, Mayes LC, et al. (2003) Parental presence during induction of anesthesia: Physiological effects on parents. *Anesthesiology* 96(1): 58–64.
- Kain ZN, Caldwell-Andrews AA, Mayes LC, et al. (2007a) Family-centered preparation for surgery improves perioperative outcomes in children: A randomized controlled trial. *Anesthesiology* 106(1): 65–74.
- Kain ZN, MacLaren J, McClain BC, et al. (2007b) Effects of age and emotionality on the effectiveness of midazolam administered preoperatively to children. *Anesthesiology* 107: 545–552.
- Kain ZN, Mayes LC, Caldwell-Andrews AA, et al. (2006) Preoperative anxiety, postoperative pain, and behavioral recovery in young children undergoing surgery. *Pediatrics* 118: 651–658.
- Kain ZN, Mayes LC, O'Connor TZ, et al. (1996) Preoperative anxiety in children: Predictors and outcomes. *Archives of Pediatrics & Adolescent Medicine* 150: 1238–1245.
- Kain ZN, Mayes LC, Wang SM, et al. (1998) Parental presence during induction of anesthesia versus sedative premedication: Which intervention is more effective? *Anesthesiology* 89(5): 1147–1156.
- Kain ZN, Mayes LC, Weisman SJ, et al. (2000) Social adaptability, cognitive abilities, and other predictors for children's reactions to surgery. *Journal of Clinical Anesthesia* 12: 549–554.
- Kain ZN, Wang SM, Mayes LC, et al. (2001) Sensory stimuli and anxiety in children undergoing surgery: A randomized, controlled trial. *Anesthesia and Analgesia* 92(4): 897–903.
- Kingsnorth S, Blain S and McKeever P (2011) Physiological and emotional responses of disabled children to therapeutic clowns: A pilot study. *Evidence-Based Complementary and Alternative Medicine* 1–10. doi:10.1093/ecam/neaq008
- Kotiniemi LH, Ryhanen PT and Moilanen IK (1997) Behavioural changes in children following day-case surgery: A 4-week follow-up of 551 children. *Anaesthesia* 52: 970–976.
- Kraaij V, Garnefski N and Schroevers MJ (2009) Coping, goal adjustment, and positive and negative affect in definitive infertility. *Journal of Health Psychology* 14: 18–26.
- Lazarus RS and Folkman S (1984) *Stress, Appraisal and Coping*. New York: Springer Publishing Company.
- Litman JA and Lunsford GD (2009) Frequency of use and impact of coping strategies assessed by the COPE Inventory and their relationships to post-event health and well-being. *Journal of Health Psychology* 14(7): 982–991.
- McEwen A, Moorthy C, Quantock C, et al. (2007) The effect of videotaped preoperative information on parental anxiety during anesthesia induction for elective pediatric procedures. *Paediatric Anaesthesia* 17(6): 534–539.
- McGraw T (1994) Preparing children for the operating-room—Psychological issues. *Canadian Journal of Anaesthesia* 41(11): 1094–1103.
- McGraw T and Kendrick A (1998) Oral midazolam premedication and postoperative behaviour in children. *Paediatric Anaesthesia* 8: 117–121.
- Martin RA (2001) Humor, laughter, and physical health: Methodological issues and research findings. *Psychological Bulletin* 127(4): 504–519.

- Martin RA and Dobbin JP (1988) Sense of humor, hassles, and immunoglobulin A: Evidence for a stress-moderating effect of humor. *International Journal of Psychiatry in Medicine* 18(2): 93–105.
- Meisel V, Chellew K, Ponsell E, et al. (2009) The effect of “hospital clowns” on distress and maladaptive behaviours of children who are undergoing minor surgery. *Psicothema* 21(4): 604–609.
- Messeri A, Caprilli S and Busoni P (2004) Anaesthesia induction in children: A psychological evaluation of the efficiency of parents’ presence. *Paediatric Anaesthesia* 14(7): 551–556.
- Ngai FW, Chan SWC and Holroyd E (2012) Maternal coping during early motherhood among first-time Chinese mothers. *Journal of Health Psychology* 17(2): 189–196.
- O’Conner-Von S (2000) Preparing children for surgery—An integrative research review. *AORN Journal* 71(2): 334–343.
- Palermo TM, Tripi PA and Burgess E (2000) Parental presence during anaesthesia induction for outpatient surgery of the infant. *Paediatric Anaesthesia* 10(5): 487–491.
- Patel A, Schieble T, Davidson M, et al. (2006) Distraction with a hand-held video game reduces pediatric preoperative anxiety. *Paediatric Anaesthesia* 16(10): 1019–1026.
- PDM Task Force (2006) *Psychodynamic Diagnostic Manual*. Silver Spring, MD: Alliance of Psychoanalytic Organizations.
- Pedrabissi L and Santinello M (1989) *Inventario per l’Ansia di “Stato” e di “tratto”: Nuova Versione Italiana dello STAI. Forma Y: Manuale*. Firenze: Organizzazioni Speciali.
- Small L (2002) Early predictors of poor coping outcomes in children following intensive care hospitalization and stressful encounters. *Pediatric Nursing* 28(4): 393–398.
- Spielberger CD (1983) *Manual for the State-Trait Anxiety Inventory (STAI: Form Y), Self-Evaluation Questionnaire*. Palo Alto, CA: Consulting Psychologists.
- Tarsitani L and Biondi M (1999) Sviluppo e validazione della scala VRS (Valutazione Rapida dello Stress). *Medicina Psicosomatica* 44: 163–177.
- Thompson N, Irwin MG, Gunawardene WMS, et al. (1996) Pre-operative parental anxiety. *Anaesthesia* 51: 1008–1012.
- Vagnoli L, Bastiani C, Turchi F, et al. (2007) Preoperative anxiety in pediatrics: Is clown’s intervention effective to alleviate children discomfort? *Algia Hospital* 2: 114–119.
- Vagnoli L, Caprilli S and Messeri A (2010) Parental presence, clowns or sedative premedication to treat preoperative anxiety in children: What could be the most promising option? *Paediatric Anaesthesia* 20(10): 937–943.
- Vagnoli L, Caprilli S, Robiglio A, et al. (2005) Clown doctors as a treatment for preoperative anxiety in children: A randomized, prospective study. *Pediatrics* 116(4): 563–567.
- Vessey JA, Bogetz MS, Caserza CL, et al. (1994) Parental upset associated with participation in induction of anaesthesia in children. *Canadian Journal of Anaesthesia* 41(4): 276–280.
- Viitanen H, Annala P, Viitanen M, et al. (1999) Premedication with midazolam delays recovery after ambulatory sevoflurane anaesthesia in children. *Anesthesia and Analgesia* 89: 75–79.
- Wang SM, Maranets I, Weinberg ME, et al. (2004) Parental auricular acupuncture as an adjunct for parental presence during induction of anaesthesia. *Anesthesiology* 100(6): 1399–1404.
- Watson AT and Visram A (2003) Children’s preoperative anxiety and postoperative behavior. *Paediatric Anaesthesia* 13(3): 188–204.
- Wennstrom B, Hallberg LRM and Bergh I (2008) Use of perioperative dialogues with children undergoing day surgery. *Journal of Advanced Nursing* 62(1): 96–106.
- Wright KD, Stewart SH and Finlay GA (2010) When are parents helpful? A randomized clinical trial of the efficacy of parental presence for pediatric anaesthesia. *Canadian Journal of Anaesthesia* 57(8): 751–758.
- Wright KD, Stewart SH, Finley GA, et al. (2007) Prevention and intervention strategies to alleviate preoperative anxiety in children: A critical review. *Behavior Modification* 31(1): 52–79.
- Yip P, Middleton P, Cyna AM, et al. (2010) Non-pharmacological interventions for assisting the induction of anaesthesia in children. *Cochrane Database of Systematic Reviews* (3): 1–61.