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# Factors affecting parental satisfaction following pediatric procedural sedation☆

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## Abstract

**Study Objective—**To investigate factors affecting parental satisfaction with a pediatric sedation service in a university hospital setting.

**Design—**Prospective, observational study with interviews using a survey instrument.

**Setting—**Academic university hospital.

**Subjects—**Parents (or legal guardians; hereafter "parents") of 220 children scheduled for sedation with the hospital's pediatric sedation service.

**Interventions and Measurements—**Caregivers of children scheduled for sedation were interviewed using a validated survey instrument. The instrument was designed to investigate the quality of communication, environment, care provided, and the overall experience. We followed patients by telephone the day after discharge. Chi-square or linear-by-linear association tests were used to evaluate associations between satisfaction scores and demographic variables; the Mann-Whitney test was used for mean levels of satisfaction in anxious versus non-anxious children.

**Main Results—**Of 222 parents approached, 220 agreed to participate (response rate = 99.1%). Significant associations between each area of satisfaction and parents' overall satisfaction existed ($P < 0.001$). Previous sedations, types of sedation, age of child, or any individual provider were not significantly associated with overall satisfaction. Caregivers of anxious children reported less satisfaction than caregivers of non-anxious children. Parents of children who underwent magnetic resonance imaging reported the lowest mean satisfaction scores.

**Conclusions—**Overall satisfaction was high, and care provided by anesthesiologists was significantly associated with overall satisfaction. A site in our institution was associated with significantly lower satisfaction as a result of inadequate space and privacy.

### Keywords

Children; Parental satisfaction; Pediatrics; Sedation

## 1. Introduction

Pediatric procedural sedation is widely used to facilitate diagnostic and therapeutic procedures. Effective sedation decreases anxiety, discomfort, and pain. Children can be

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effectively immobilized without the psychological trauma of physical restraint, thereby increasing child cooperation and the success rate of the procedure. In addition, completion of minor procedures outside of the operating room (OR) increases OR availability and decreases costs [1–3].

Patient satisfaction has emerged as an essential component of the quality of medical care. Patient-centered outcomes are often the primary means of measuring the effectiveness of health care delivery [4]. Thus, patient satisfaction is important because it ensures the quality of care and communication, and it generates better clinical outcomes [5,6]. The leadership and strategies required to build a patient-centered culture also result in improved employee satisfaction, because an organization cannot meet the needs of patients until it provides adequate training and support for all employees [7].

There is a large body of knowledge on patient satisfaction in anesthesia, but there are no studies that primarily assess satisfaction with pediatric procedural sedation. Thus, we sought to investigate parental satisfaction with pediatric procedural sedation delivered at our institution by a “mobile provider” sedation service model, in which pediatric anesthesiologists and a team of sedation nurses administer sedation in a variety of office-based locations.

We interviewed parents and legal guardians of children who received care provided by our pediatric sedation service using a validated instrument for parental satisfaction in pediatric anesthesia, modified to reflect the sedation environment. We hypothesized that the overall level of satisfaction would be high, and that it would be predicted by several demographic and care variables, including age of the child, level of child anxiety, type of sedation (light or deep), and care provided by the anesthesiologist.

## 2. Materials and methods

Following Oregon Health and Science University Hospital institutional review board approval and written, informed consent from each subject, 220 parents or legal guardians (hereafter referred to as “parents”) of children younger than 18 years of age, who were scheduled for sedation with the pediatric sedation service, were recruited over a 7-week period in 2006. Consecutive patients were recruited. Pediatric procedural sedation was conducted in a variety of locations. The magnetic resonance imaging (MRI) and computed tomographic (CT) scanners were located in the adult wing of the hospital. Sedation and recovery occurred in adjacent rooms in this area separated by curtains. Procedure rooms were used for pediatric procedural sedation in other locations in both the adult and pediatric wings of the hospital.

Subjects included those undergoing minimal or moderate sedation (hereafter referred to as “light sedation”) with sedation nurses, and those undergoing deep sedation delivered by a team including pediatric anesthesiologist and sedation nurse. Light sedation was performed using oral, nasal, or intravenous (IV) midazolam alone, or with the addition of a maximum of three sub-anesthetic doses of IV ketamine 0.25 mg/kg at 5-minute intervals according to written protocol. Deep sedation was induced with a combination of midazolam, propofol, and pentobarbital (two to 4 mg/kg), or with midazolam and propofol only.

The investigator informed subjects about the study and its aims, confirming that identifying information would remain anonymous and that the results were confidential. The investigator then conducted a personal, face-to-face interview. All interviews were conducted after the sedation team left the area so as to avoid any inadvertent influence on the responder.

Each of the 12 anesthesiologists and 8 nurses participating were assigned a unique identifier known only to the investigators. This step was taken to identify satisfaction ratings that may be specific to individual providers.

### 2.1 Satisfaction questionnaire

The questionnaire was based on a previously validated instrument, slightly modified to reflect satisfaction with pediatric "sedation" instead of pediatric "anesthesia" [8] [Appendix A]. The instrument was designed to investigate several areas: quality of communication, quality of environment, quality of care provided by the anesthesiologists and sedation nurses, parental opinion of the child's recollection, and parental opinion of the overall experience. Responses were recorded using a 10-point Likert scale. Suggestions for improvement were solicited using an open-ended question at the end of the interview. Parents were also contacted by telephone the following day regarding complications or side effects following discharge that may have affected their perception of the sedation.

### 2.2 Statistical analysis

Statistical analysis was performed with SPSS v14.0 software (SPSS Inc, Chicago, IL, USA). Chi-square and linear-by-linear association tests were used to evaluate associations between overall satisfaction, other satisfaction scores, and demographic variables. To compare levels of satisfaction in anxious and non-anxious children, a nonparametric, two-sample independent test (Mann-Whitney) was used.

## 3. Results

### 3.1 Respondents

Of the 222 parents approached, 220 agreed to participate (response rate = 99.1%). Of the 220 interviews, 31 had only fathers present (14.1%), 117 had only mothers present (53.2%), and 72 had both parents present (32.7%). Parent perception of child anxiety, child recollection, and overall satisfaction were not significantly associated with which parent was present. Patient demographics are shown in Table 1.

### 3.2 Satisfaction Scores

Satisfaction scores across the various areas investigated were generally high (Table 2). The mean satisfaction score for every area studied was 9.0 or higher, and roughly two thirds or more of respondents in each area reported a satisfaction score of 10. Using linear-by-linear associations, significant associations between each area of satisfaction and parents' overall satisfaction ($P<0.001$) were found. Contrary to our hypothesis, age of the child was not significantly associated with overall satisfaction ($P = 0.441$). There was also no difference in mean overall satisfaction scores for light versus deep sedation (9.29 vs. 9.20, $P = 0.265$). In addition, no individual nurse or anesthesiologist was identified as having a significantly different association with any others or with the overall satisfaction rating (individual provider $P$-values range from 0.23 to 0.64). There was no difference in overall satisfaction scores in patients with a history of previous sedations (n = 170) compared with patients with no history of previous sedations (n = 50; 9.23 vs. 9.18, $P = 0.292$), respectively. Similarly, a previous history of surgery did not affect overall satisfaction scores (9.28 vs. 9.15, $P = 0.769$) when compared to patients with no previous surgery, respectively.

Of the 220 parents who participated in this study, only 8 (3.6%) rated their overall satisfaction with pediatric procedural sedation as a score of 5 or lower. Of these 8 parents, 4 mentioned unexpected issues that occurred before the sedations began; three indicated they thought their children were afraid; and one mentioned that both the nurse and anesthesiologist were too hasty.

### 3.3 Child anxiety and parental satisfaction

We examined child anxiety and the potential effect on parent satisfaction using the Mann-Whitney test. Child anxiety was present if parents indicated they thought their child was afraid. Sixty-two (28.2%) parents reported that their child felt afraid or anxious. Table 3 compares the demographic characteristics and satisfaction ratings between the anxious group and the non-anxious group. Several areas of satisfaction were significantly different in the reports of parents of anxious versus non-anxious children such as environmental comfort, care given by the anesthesiologist before and after the procedure, parental opinion of the child's recollection, and overall satisfaction. Parents of anxious children reported less satisfaction than did parents of non-anxious children.

### 3.4 Type of procedure and satisfaction

To assess the effect of the type of procedure on satisfaction, we categorized procedures into four categories. Eighty-eight sedations were performed in the MRI group (87 deep, one light sedation), 23 in the CT group (three deep, 20 light sedations), 66 in the hematology-oncology group (63 deep, three light sedations), and 43 in the other procedures group (18 deep, 25 light sedations). Using the Mann-Whitney test, we found that parents of children who underwent MRI reported the lowest mean satisfaction scores compared with the group with the next lowest mean scores. Significant factors included the MRI environment ($P < 0.001$), parental opinion of child's recollection ($P = 0.015$), and overall satisfaction ($P = 0.002$).

### 3.5 Suggestions for improvement

Fifty-one parents gave responses (23.3%) to the open-ended question regarding suggestions for improvement of the sedation service. Of these responders, 33 (64.8%) suggested changes to the MRI environment ("room too small/hectic", "felt claustrophobic", "make more child-friendly"), 9 (17.6%) reported communication problems ("didn't know wait-time", "coordination was confusing"), and 4 (7.8%) had problems related to locating the department. Two (3.9%) commented on the anesthesiologist ("doctor didn't know what was previously done", "doctor needs to be more compassionate"), and three (5.8%) commented on the nurse ("nurse couldn't find IV", "nurse couldn't find vein").

### 3.6 Post-discharge follow-up

We were able to contact 165 parents by telephone within three days of discharge (75% response rate). Of the 165 parents, 8 (4.8%) indicated there were side effects or complications such as nausea and/or vomiting.

## 4. Discussion

Quality in health care has two dimensions. Technical excellence is the skill and competence of health professionals, procedures, and systems to accomplish intended tasks reliably and effectively. The other dimension is related to the subjective experience (ie, the experience of illness and health care through the patient's eyes) [9]. Any health care system must address both aspects of quality. Patient satisfaction is probably the most common method to evaluate quality through the patient's eyes [5,9–11].

Although satisfaction with pediatric anesthesia has been reported, we were unable to identify any reports of satisfaction with pediatric procedural sedation in any meaningful way. Gozal et al. assessed global satisfaction with pediatric procedural sedation by asking parents whether they were "very satisfied, satisfied, or not very satisfied" with their service, but they made no attempt to quantify parental satisfaction or investigate predictors of satisfaction following pediatric procedural sedation [12]. A survey from the Picker Institute Europe

determined that the major predictors of patient satisfaction were physical comfort, emotional support, and respect for patient preferences. Adequacy of analgesia in physical comfort is an important factor, but it was not the sole explanation in a recent study showing high patient satisfaction scores among patients with differing levels of pain intensity [13]. Interestingly, the Picker Institute Europe survey also noted that 55% of the respondents who rated their inpatient episode as “excellent” also indicated problems with 10% of issues mentioned on the questionnaire. They concluded that global satisfaction ratings were likely to provide a “limited and optimistic” picture unless detailed questions about specific aspects of patients’ experiences were included [14]. Previously, the lack of such qualitative data about satisfaction following pediatric procedural sedation made it difficult to draw any conclusions about the quality of care provided. Such data are particularly relevant as the pediatric procedural sedation experience for families of young children is often their first exposure to a pediatric referral center, usually preceding surgery or treatment.

The method of administration of patient surveys invariably introduces bias of one kind or another. We chose to conduct standardized, face-to-face interviews as opposed to mail surveys so as to minimize recall bias; the literature indicates that this approach is more suited to determining parental satisfaction [15]. Given that the response rate of our questionnaire was very high (99.1%), it is likely that the results are an accurate representation of parental satisfaction with pediatric procedural sedation at our institution. Though we did not reassess satisfaction during the follow-up telephone call, it would not be unreasonable to suggest that the low frequency of self-limited and relatively minor side effects noted by telephone follow-up (<5%) would have affected their satisfaction significantly.

We found a high rate of parental satisfaction with our sedation service, measured by 8 quantitative dimensions. These measures conform to many of the 8 dimensions of patient-centered care as formulated by the Picker Institute Europe that are widely considered key determinants of quality; they include access, respect, coordination and integration of care, communication, physical comfort, emotional support, involvement of family and friends, and continuity of care [16]. Though satisfaction following pediatric anesthesia may not be similar to satisfaction following pediatric procedural sedation, the rate of satisfaction compares very favorably with such studies [8,11]. Iacobucci et al. found a high overall parental satisfaction score with children undergoing general anesthesia, with a median score of 9 on a scale from 0–10. This finding is similar to the results of our study, which had a median overall parental satisfaction score of 10 on an identical scale.

We chose not to compare mean satisfaction scores of the 8 nurses to the 12 anesthesiologists, because nurses were involved in deep sedation with the anesthesiologist, and when they provided sedation alone, they did so only for light sedation, which would not be a valid comparison. However, there was no difference in mean satisfaction scores for light versus deep sedation, nor any individual provider with significantly lower scores than the other providers.

Our study showed that the environment in which the sedation takes place has a significant impact on child anxiety and parental satisfaction. This finding is not surprising given that the environment is partly responsible for comfort, which is one of the 8 Picker Institute Europe criteria for quality of patient-centered care, and that exposure to a particular environment is a stimulus for altering a patient’s mood [17]. Our study provided us with objective evidence that significant improvements to an unsatisfactory sedation area (MRI) were needed, such as increasing the room size and ensuring privacy. This information can be used to demonstrate to hospital managers that changes are necessary to ensure the comfort and privacy of patients undergoing pediatric procedural sedation at our institution. The role of the

environment in increasing child anxiety has even broader implications, as increased levels of preoperative anxiety are associated with increased incidence of emergence delirium and other postoperative maladaptive behaviors following anesthesia [18]. In addition, logistical issues were the subject of approximately a quarter of the open-ended responses received, and they pertained to inadequate communication before the hospital encounter, confusing check-in instructions, and difficulty locating the sedation site.

There are some limitations to our study. The nurses and anesthesiologists who participated in the study were aware of it, and this could have influenced their practice during the study period. However, this response should have been largely attenuated due to the high volume of procedures done during the 7-week enrollment period. In the absence of an existing instrument for measurement of satisfaction with pediatric procedural sedation, the use of an instrument validated for pediatric anesthesia may not encompass all facets of the pediatric procedural sedation experience despite the modification in wording to reflect procedural sedation. That is, the circumstances of anesthesia (drugs employed, types of procedures performed, and postoperative care) may well differ from those of sedation. Though the differences between anxious and non-anxious groups of children were significant in our study, the determinant of anxiety in our study was limited to parental opinion of their children as opposed to an assessment using a validated scale. Although we had originally proposed also interviewing children about satisfaction, we found that the vast majority of children were not alert enough to participate following pediatric procedural sedation. Therefore, our data reflect parental satisfaction, which may be distinct from child satisfaction. We did not ask parents about their recollection of the quality of previous sedation experiences, if any, and in this subgroup it is possible that negative or positive experiences may have affected their perception of the present experience. However, multiple sources of bias would affect the accuracy of these recollections, such as the length of time since sedation, recall of sedation (which is likely to be high if the previous experience was very negative), and the type of sedation and investigation. We did not track delays to sedation start times, but if there were a significant number of delays that could have affected overall satisfaction, parents would have been likely to mention it in the open-ended question in the survey.

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## Appendix A. Questionnaire for Parents

**1** According to you, how satisfactory were the instructions given to you by the sedation nurse regarding preparation for your child's sedation?

**(Not at all)** 0…1…2…3…4…5…6…7…8…9…10 **(Very)**

If you found this *unsatisfactory* was it because: (mark all boxes that apply)

Too rapid, hasty ☐

Not very clear ☐

Not very affectionate ☐

Not very reassuring ☐

Other _____ ☐

**2** Were there any unexpected issues before the sedation began that you were not happy about?

Yes ☐

No ☐

If 'Yes', please explain:

**3** If there was something you were not happy about, was it addressed or explained to your satisfaction?

Yes ☐

No ☐

**4** Before the procedure with sedation:

**a.** How comfortable was this environment for you and your child?

**(Not at all)** 0…1…2…3…4…5…6…7…8…9…10 **(Very)**

**b.** According to you, how satisfactory and gentle was the behavior of the *sedation nurse*?

**(Not at all)** 0…1…2…3…4…5…6…7…8…9…10 **(Very)**

**c.** If you found this *unsatisfactory* was it because: (mark all boxes that apply)

Too rapid, hasty ☐

Not very clear ☐

Not very affectionate ☐

Not very reassuring ☐

Other _____ ☐

**5** *Before the procedure with sedation*:

**a.** According to you, how satisfactory and gentle was the behavior of the *anesthesiologist*?

**(Not at all)** 0…1…2…3…4…5…6…7…8…9…10 **(Very)**

**b.** If you found this *unsatisfactory* was it because: (mark all boxes that apply)

Too rapid, hasty ☐

Not very clear ☐

Not very affectionate ☐

Not very reassuring ☐

Other _____ ☐

**6** *After the procedure*:

**a.** How sufficient was the care provided by the nursing staff?

**(Not at all)** 0…1…2…3…4…5…6…7…8…9…10 **(Very)**

**b.** How sufficient was the care provided by the anesthesiologist?

**(Not at all)** 0…1…2…3…4…5…6…7…8…9…10 **(Very)**

**7** In your opinion, will your child have a generally bad/negative memory of the procedural sedation experience?

Assess from 0 to 10.

**(Very bad/negative memory)** 0…1…2…3…4…5…6…7…8…9…10 **(Excellent Memory)**

Because: he/she was afraid ☐

suffered pain ☐

did not like the care of the anesthesia doctor ☐

did not like the care of the sedation nurse ☐

found the environment ugly ☐

other _____ ☐

**8** If you should give an overall judgment on your child's experience for this procedure, would it be?

**(Very Bad)** 0…1…2…3…4…5…6…7…8…9…10 **(Excellent)**

**9** What would you advise in order to improve our service?

_____

_____

_____

_____

**Table 1**

Child demographics (N = 220)

| | N (%) |
|---|---|
| Boys/Girls | 122 (55.5%)/98 (44.5%) |
| Age (median, range) | 5 years (one to 17 yrs) |
| ASA physical status | |
| ASA I | 18 (8.2%) |
| ASA II | 44 (20.0%) |
| ASA III | 158 (71.8%) |
| Type of sedation | |
| Light (minimal/moderate) | 49 (22.3%) |
| Deep | 171 (77.7%) |
| Race/ethnicity | |
| American Indian/Alaskan Native | 2 (0.9%) |
| Asian | 6 (2.7%) |
| Black or African American | 1 (0.5%) |
| Hispanic/Latino | 29 (13.2%) |
| White | 182 (82.7%) |

## Table 2

Descriptive statistics on satisfaction items

| Item | N | Mean | Range | Percent answering “10” |
|---|---|---|---|---|
| Instructions regarding child’s sedation prior to procedure | 220 | 9.84 | 3–10 | 91.4 |
| Environmental comfort | 220 | 9.03 | 0–10 | 65.5 |
| Care provided by nurse pre-procedure | 219 | 9.82 | 0–10 | 92.6 |
| Care provided by anesthesiologist pre-procedure | 211 | 9.81 | 5–10 | 87.7 |
| Care provided by nurse post-procedure | 219 | 9.93 | 8–10 | 94.1 |
| Care provided by anesthesiologist post-procedure | 173 | 9.86 | 8–10 | 90.2 |
| Opinion of child’s recollection | 220 | 9.00 | 0–10 | 63.2 |
| Overall satisfaction with pediatric sedation | 220 | 9.17 | 0–10 | 64.5 |

N values vary due to ‘not applicable’ responses.

## Table 3

Mean differences in demographic characteristics and satisfaction scores in anxious and non-anxious children

| Item | Mean in anxious children | Mean in non-anxious children | *P*-value |
|---|---|---|---|
| Demographic variables | | | |
| Age of child (yrs) | 4.79 | 5.55 | 0.387 |
| Previous sedations (n) | 4.16 | 5.85 | 0.530 |
| Previous surgeries (n) | 0.92 | 1.32 | 0.174 |
| Satisfaction scores | | | |
| Instructions on child's sedation prior to procedure | 9.85 | 9.84 | 0.85 |
| Environmental comfort | 8.23 | 9.34 | < 0.001 |
| Care given by nurse pre-procedure | 9.73 | 9.85 | 0.168 |
| Care given by anesthesiologist pre-procedure | 9.64 | 9.87 | 0.032 |
| Care given by nurse post-procedure | 9.90 | 9.94 | 0.157 |
| Care given by anesthesiologist post-procedure | 9.76 | 9.90 | 0.047 |
| Opinion of child's recollection | 7.18 | 9.72 | <0.001 |
| Overall satisfaction with pediatric sedation | 8.06 | 9.61 | <0.001 |