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Reducing Anxiety in the Pediatric Emergency Department: A Comparative Trial

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Abstract

Background—Anxiety among patients in a Pediatric Emergency Department (PED) can be significant but often goes unaddressed.

Objective—To determine whether exposure to Child Life (CL) or Hospital Clowning (HC) can reduce anxiety in children presenting to a PED.

Methods—Patients were randomized to CL, HC or control and assessed upon: entry to examination room (T1), prior to physician arrival (T2) and during physician examination (T3), using the modified Yale Preoperative Anxiety Scale (m-YPAS). CL and HC interventions occurred for 5–10 minutes prior to physician entry. Effects were analyzed using mixed ANOVA.

Results—m-YPAS scores ranged from 23 to 59, with a higher score indicating increased anxiety. Mixed ANOVA on the study sample (n=113) showed a significant interaction between groups (CL, HC, control) and time, $p = .02$. Further analyses indicated effect of group only at T2 ($M_{CL} = 23.8$, 95% CI 23.2–24.5; $M_{HC} = 25.2$, 95% CI 24.2–26.2; $M_{control} = 26.1$, 95% CI 24.2–27.9), p

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Data from this study have been previously presented at the following academic conferences: Gerry Schwartz and Heather Reisman 3rd International Conference on Pediatric Chronic Diseases, Disability and Human Development in Jerusalem, Israel (December 2012, oral presentation), Society of Pediatric Psychology (SPP) National Conference in New Orleans, Louisiana, USA (April 2013, poster presentation) and Pediatric Academic Societies Annual Meeting in Washington, D.C., USA (May 2013, poster presentation).

= .02. Sub-analysis of patients with T1 m-YPAS score ≥ 28 ($n=56$) showed a significant interaction between group and time, $p = .01$. Further analysis showed effect of group only at T2 ($M_{CL} = 24.4$, 95% CI 23.3–25.6; $M_{HC} = 27.0$, 95% CI 25.2–28.7; $M_{control} = 29.2$, 95% CI 25.6–32.7), $p = .003$.

Conclusion—CL services can reduce SA for patients presenting to a PED with heightened anxiety at baseline. This reduction occurred immediately following CL intervention, but was not observed in patients exposed to HC or during physician examination.

Keywords

emergency department; state anxiety; child life; hospital clowning; pediatrics

Introduction

Anxiety among patients treated in a Pediatric Emergency Department (PED) can be significant. Causes of anxiety have been linked to environmental stimuli, physical discomfort and loss of control [1]. Situational anxiety, such as that experienced in a PED setting, is referred to as state anxiety (SA). SA may have lasting effects on how patients use the health care system or comply with treatment recommendations [2]. However, SA in children can be difficult to detect and treat [3,4]. For this reason, the American Academy of Pediatrics endorses that health care professionals have a responsibility to address anxiety and create favorable environmental conditions for pediatric patients in the PED setting [5].

Anxiety reduction strategies vary, and include pharmacologic and child life interventions, hospital clown services, music, video games, parental coaching, and toys [5–13]. When hospitals do employ behavioral strategies, they are often reserved for children in the pre- and peri-procedural settings [6–11]. Unfortunately, the psychosocial needs of many patients who have SA while being in a PED are not adequately addressed. Child Life (CL) and Hospital Clown (HC) services are well-established in various pediatric institutions. CL services may decrease anxiety, decrease pain and support family involvement in anxiety reduction. CL has an established role in a PED [14–16], but specialists are often only involved during procedural care, such as laceration repair and angio-catheter insertion. Little research exists on CL for non-procedural care in PEDs [16–17]. HC services are available internationally at pediatric hospitals and have reduced SA in pediatric patients [18–19]. Yet, there is limited scientific literature concerning the role of HC specifically in PEDs [20–21]. Similar to CL studies, the majority of HC research is focused on the positive effects of HC among pediatric patients entering surgery or undergoing a procedure [22–24]. Given that limited research exists concerning HC and CL and their effect on SA in the PED setting, our objective was to determine whether HC and CL services reduced state anxiety in children presenting to a PED with non-procedural complaints.

Material and Methods

This study was a prospective, single blinded randomized control trial conducted between November 2011 and December 2012. Our investigation was performed at a university-affiliated children's hospital located in a large metropolitan area of the United States, which

sees approximately 65,000 pediatric patients per year. The Institutional Review Board our institution approved the study. All interventions performed were in accord with the standards of the Committee on Human Experimentation at our institution.

Study investigators monitored the PED electronic tracking board for patients aged five to 12 years, triaged as non-urgent, and not requiring invasive procedures. Age limitations were determined by the m-YPAS tool, which was validated in children ages five to 12 years. We considered any procedure that would require a break in the skin or anatomical orifice as invasive. Those patients potentially requiring painful procedures, less than five or greater than 12 years of age were automatically excluded. For example, a child with cough and rhinorrhea would be identified as a potential participant. Alternatively, a patient with limb pain who may need reduction, sedation or intravenous analgesia would be excluded. During the course of enrollment, 135 patients were approached, of which 15 families declined participation for reasons such as not wanting to be video-recorded. No patient during this study was enrolled and then excluded because he or she required an invasive procedure when one was not anticipated.

Once enrolled, patients were assigned to an intervention (CL or HC) or control group based on the pre-determined randomization, using SAS/STAT software, which was distributed in numbered folders [25]. The principal investigator would open a numbered folder and activate the appropriate intervention (CL or HC). Upon assignment, patients and families entered an empty examination room to complete a demographic questionnaire. At this point the patient was video recorded for five minutes in order to gather baseline data (T1).

Following T1, patients were exposed to their intervention without continued recording. Control group patients waited five minutes in the examination room. CL group patients engaged in a five-minute protocol that included a greeting, gathering of name and age, assessment of previous PED or CL experience, asking for the presenting problem, providing an explanation of CL services, and finally, an age-appropriate CL activity. HC group participants received a five-minute entertainment show of bubbles, joke-telling, balloons, or music. Both the CL and HC interventions were administered by a CL specialist, who attended a formal eight-week hospital clown-training course prior to the start of the study.

After the intervention or non-intervention, patients were then video-recorded without evidence of which group they were assigned to (T2). Participants were video-recorded for a third time (T3) during the physician's examination. The study design is depicted in Figure 1.

Video recordings of patients at T1, T2, and T3 were then scored using the Modified Yale Preoperative Anxiety scale (m-YPAS) that served as our primary outcome measure. The m-YPAS is an observational scale used to assess anxiety in children aged five to 12 years and has been validated against the State Trait Anxiety Inventory for Children (STAIC) [26]. The m-YPAS consists of five domains of anxiety, can be applied to assess anxiety in less than one minute and does not rely on participants to answer questions concerning their level of anxiety.

Two graduate students were trained to observe and score the m-YPAS. Both coders were intentionally unaware of patients' random assignment in order to avoid coder bias. The first

five cases were used to ensure quality and efficiency of procedures as well as to establish inter-rater reliability for scoring the m-YPAS ($k=0.90$).

We hypothesized that engaging pediatric patients to HC or CL interventions would reduce SA by 30%–40% compared to control. Also, we believed that the HC intervention would have a 20% larger decrease in SA compared to CL and that this reduction would last longer. In other words, non-urgent patients exposed to CL and HC interventions would have reduced anxiety immediately following exposure and at the time of the physician examination. The SA reduction at the time of examination was expected to be 20% larger in HC than CL.

Prior to patient enrollment, a sample size calculation was performed. By hypothesizing a small difference (20%) in SA (m-YPAS score) between HC and CL at T3, we determined that a sample size, assuming alpha of 0.05 and 80% power, of 120 patients (30 control, 45 HC and 45 CL) would be needed to demonstrate a significant difference in SA. Once the sample size was calculated, randomization was generated using SAS/STAT software [25].

During data screening prior to statistical analyses, we examined a boxplot of m-YPAS scores at T1 to check for outliers. This boxplot revealed three patients with scores that were three standard deviations above the mean. This same process was performed for T2 and T3. Two additional patients in the T2 boxplot had scores that were four standard deviations from the mean. T3 boxplot showed no extreme outliers. As outliers that could distort the results, these five patients were removed from the sample [27]. Although we had the option to analyze the extremely anxious patients, we felt that these patients were not representative of the majority of our patients as a sample.

The Statistical Package for the Social Sciences [28] was used to compute summary statistics (e.g., means, standard deviations), the Kappa coefficient, and mixed between-within groups analysis of variance (ANOVA). For each statistically significant ANOVA result, partial η^2 as a measure of effect size was reported.

Results

The sample at completion of data collection included 120 patients ($M_{\text{age}}=7.58$ years, $SD=2.12$; 51% male). Complete demographic information is presented in Table 1. In addition to the five outlier patients, two patients with missing m-YPAS data were excluded from analyses. The final, analyzed, sample consisted of 113 patients (29 control, 41 CL group, and 43 HC group), as shown in Figure 2.

In the mixed between-within groups ANOVA model for the sample of 113 patients analyzed, the following variables were identified: “group” as the between-groups independent variable (control versus CL versus HC), “time” as the within-groups independent variable (T1 versus T2 versus T3), and m-YPAS as the dependent variable. The ANOVA model showed a significant interaction effect between group and time on m-YPAS ($p=0.02$). Partial η^2 (i.e., measure of effect size) was 0.05, which indicated that the interaction effect was small. Simple effects testing was then conducted to examine at which time point the change in m-YPAS was significant. Specifically, we used the multivariate

analysis of variance (MANOVA) approach in this testing, which revealed a significant simple effect of group on m-YPAS at only T2 ($p=0.02$; Figure 3). However, post-hoc pairwise comparisons (Bonferroni-corrected $\alpha=0.01$) of the 3 group m-YPAS means at Time 2 revealed that the group means were not statistically different from one another ($p=0.02$; Table 2). We found an equivalent pattern when we included the five patients with outlier data.

Among 56 patients whose m-YPAS scores were 28 or higher at T1 (13 in the control group, 24 in the CL group, and 19 in the HC group), the mixed between-within groups ANOVA model again showed a significant interaction effect between group on m-YPAS ($p=0.01$). Partial η^2 was 0.11, which indicated that the interaction effect was small. Simple effects testing, using the MANOVA approach, revealed a significant simple effect of group on m-YPAS at only T2 ($p=0.003$; Figure 4). Post-hoc pairwise comparisons (Bonferroni-corrected $\alpha=0.01$) indicated that the clowning group m-YPAS mean was not significantly different from both the CL group mean ($p=0.12$) and control group mean ($p=0.37$), but the CL group mean was significantly different than the control group mean ($p=0.003$, Table 3). Overall, CL showed a statistical impact on patients with higher anxiety at baseline, in that its implementation resulted in a decrease in anxiety.

Discussion

Our efforts confirmed previous research citing the presence of SA in a PED [1]. Although SA was not ubiquitous to all PED patients, our data indicates that heightened SA was present in half of patients presenting for non-procedural complaints. For all study participants, exposure to HC or CL interventions did not demonstrate a significant reduction in anxiety compared to controls. However, for patients with heightened SA at baseline (m-YPAS ≥ 28), our data suggests that CL can reduce SA immediately following the intervention.

Since much of the research devoted to pediatric anxiety reduction involves pre- and peri-procedural SA, it was important to draw attention to those patients experiencing SA simply by being in a PED. Nager et al noted this by demonstrating, via use of the STAIC, that 36% of patients aged 10–18 years experienced clinically significant levels of anxiety [1]. Our data demonstrated that half of patients five to 12 years presented with a baseline m-YPAS score ≥ 28 . The m-YPAS score of ≥ 28 has been seen in children experiencing pre-operative anxiety was used as a proxy of baseline SA for our study [26]. Nager et al reported a significant correlation between age and SA, with younger patients having a higher likelihood of being anxious [1]. By employing the m-YPAS, we were able to examine younger patients and show a higher percentage of SA among patients in a PED. We were able to demonstrate that even without undergoing procedures, PED patients may still experience SA. Heightened level of anxiety may alter the way individuals respond to pain and navigate future experiences with the medical community [2, 29]. Understanding that SA can develop simply from being in a PED and that SA has short and long term sequelae, makes the need to reduce SA essential.

Our original objective for this study was to demonstrate that pediatric patients presenting to a PED would benefit from anxiety reduction strategies in a similar fashion to patients needing invasive treatments. Specifically, we hypothesized that children exposed to CL or HC services would have a 30–40% lower level of SA compared to controls when physicians entered an examination room. Unfortunately, when looking at our study population as whole, we found SA among patients in the HC and CL lessened compared to control only at T2 and only to a small extent. Neither the HC nor CL group showed a significantly lower level m-YPAS score at T3 compared to control. Thus, for patients studied, exposure to CL or HC did not appear to lower SA any more than awaiting care in the PED. This proved contrary to research performed on pre-operative and pre-procedural situations that showed that HC and CL could statistically decrease SA in a child. For example, Gursky et al was able to demonstrate that for children undergoing laceration repair, those who received preparation and distraction from a CL specialist showed less distress than patients not receiving intervention [17]. Regarding the use of HC, Vagnoli et al demonstrated that children interacting with clowns before entering an operating room had m-YPAS scores 30 points lower at induction than those who had not interacted with clowns [22]. Thus, the question becomes why children experience significant anxiety reduction with HC and CL prior to procedures but not during non-procedural medical encounters. A possible reason is that children preparing for procedures have higher SA than those presenting for cough and viral syndromes, which is implicated in our study (i.e., lower mean baseline m-YPAS scores compared to Vagnoli). It is also possible that patients simply do not respond to psychosocial techniques unless they were initially experiencing a heightened level of SA, which was implicated in our sub-sample. However, a second possibility exists that our lack of significant findings was not a function of the presenting problem, but of how the psychosocial intervention was administered. In both the Gursky and Vagnoli studies, as well as in numerous other studies [16,23–24], HC and CL services remained with children during the duration of procedure or induction of anesthesia. In our study HC and CL interventions stopped prior to the T2 video recording. This was done to ensure blinded scoring. However, in retrospect, it is possible our data might have demonstrated more significant findings if the CL specialist and the HC had remained by the patient's side when the physician interacted with the patient.

Since our full-sample findings did not parallel previous research, we examined at a sub-sample of patients that had similar baseline levels of anxiety to those entering an operating room or experiencing a procedure. Using previous literature employing the m-YPAS to set a baseline, we analyzed patients with a T1 m-YPAS ≥ 28 . The patients in this sub-sample had a mean m-YPAS similar to the patients in Vagnoli's study awaiting surgery. CL patients in this sub-sample showed a significant change in SA at T2 with decreasing mean m-YPAS scores. Although HC patients had a T2 decrease in m-YPAS, this did not prove significant compared to control. Neither HC nor CL groups had a significant drop in SA compared to control at T3. However, unlike patients in the Vagnoli study, the Patel and Golan studies who, regardless of intervention, showed an increase in SA during anesthesia induction (HC being significantly lower than control in the Vagnoli study), our baseline anxious patients had lower m-YPAS scores when exposed to CL or HC interventions [12,24]. Patients in this sub-sample did demonstrate similar behavioral responses to patients in Golden's study who

received a toy prior to premedication for surgery and subsequently had a drop in their mean m-YPAS [11]. We were unable to find a study employing m-YPAS for a CL intervention. However, Gursky et al did demonstrate, by using the Observational Scale of Behavioral Distress, that when patients were exposed to CL, while undergoing laceration repair, they had a slight decrease in distress following intervention. Furthermore, these patients demonstrated less increase in distress during repair compared to those patients repaired with standard procedure alone [17,30]. By evaluating patients with an m-YPAS 28 we were able to compare our non-procedural patients with those in pre-procedural studies. Although the primary goal of these other studies was to show reduced increase in SA (rather than decrease), our study indicates that for baseline anxious patients, meaningful SA reduction is possible. Furthermore, this reduction in anxiety need not be limited solely to patients undergoing procedures. Since CL services statistically (and observationally HC services) help baseline anxious PED patients regardless of presenting complaint, it is possible that access to these services should be tailored more towards a child's level of distress instead of simply to the chief complaint. To meet this goal, it is imperative that anxious patients be appropriately and efficiently identified.

Limitations

Anxiety reduction observed in our sub-sample was limited to T2 and did not continue through the presumed stressful insult of physician entry at T3. While it is possible this result may be a true reflection of how CL and HC influence pediatric patients entering a PED, there were several limitations in our study which may have influenced its outcome. Foremost, our PED is limited by a fairly homogenous ethnic population. Since the majority of our study population identified as Hispanic/Latino, it is unclear whether our results generalize to other institutions with a more ethnically and culturally heterogeneous population.

Compared to other studies examining SA, our participants had a lower level of SA at baseline. Understanding that anxiety reduction measures tend to work better on patients with heightened levels of anxiety, the effects of HC and CL may have been limited for patients with lower anxiety at baseline. It is possible that this was simply a byproduct of methodology that only included non-acute and non-urgent patients and that may be patients who are less ill are, by nature, less anxious. However, this is difficult to rationalize, as children, for the most part, do not know the acuity of their disease process and furthermore do not know whether an invasive procedure will be performed. Future studies may seek to enroll higher acuity PED patients to test whether these patients present with a heightened SA. However, studies of this nature may find difficulty balancing scientific investigation and the urgency of medical care. Furthermore, a study of this type would likely limit the ability to test non-procedural SA as some higher acuity PED patients may inevitably require invasive procedures.

Conclusion

Child Life services can reduce state anxiety for low acuity patients presenting to a pediatric emergency department with heightened state anxiety at baseline. The reduction of state

anxiety was limited to immediately following psychosocial intervention and did not continue through physician examination. Understanding this, pediatric and general emergency departments can consider using child life specialists for patient anxiety reduction. Hospital clowning interventions did not show statistically significant anxiety reduction in our study.

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Article Summary

Why is this topic important? State Anxiety (SA) in Pediatric Emergency Department (PED) patients is a prevalent problem and can have a significant impact on patient care. Child Life (CL) and Hospital Clown (HC) services have established roles in the medical community and can decrease SA during procedures and pre-operatively. Little evidence exists regarding these services in non-procedural patients.

What does this study attempt to show? This study attempts to determine whether exposure to CL or HC can reduce SA in non-urgent children presenting to a PED. This is the first study examining the role of CL and HC services for non-procedural patients in a PED.

What are the key findings? This study shows that CL services can reduce SA in anxious patients presenting to a PED not needing invasive procedures.

How is patient care impacted? Often CL and HC services are focused on pediatric patients undergoing painful or invasive procedures. Data suggesting that CL services can reduce SA in non-urgent patients, not requiring procedures, should encourage health care providers to consult these services on a more frequent basis. Consulting CL on more patients will hopefully reduce SA and subsequently improve diagnosis and compliance with recommendations.

Figure 1.

Figure 2.

Figure 3.
Mean Anxiety by Group Across Time (Analyzed Sample)

Figure 4.
Mean Anxiety by Group Across Time (Sub-Sample)

Table 1

Demographics

Demographic	Control (n=29)	CL (n=41)	HC (n=43)	P
Gender				0.79
Male	14	23	22	
Female	15	18	21	
Age (Years)				0.86
Mean	7.48	7.41	7.70	
Standard Deviation	1.96	2.09	2.26	
Median	7.00	7.00	7.00	
Race				0.37
Hispanic/Latino	25	39	37	
Non-Hispanic/Latino	4	2	6	
African American/Black	1	0	2	
Asian/Pacific Islander	0	1	0	
Caucasian	0	0	2	
Other (e.g., multi-racial)	3	1	2	
Chief Complaint				0.81
Gastrointestinal	5	5	9	
Pain/Trauma	8	16	11	
Respiratory	5	3	5	
Simple Infection	4	9	9	
Other (e.g., systemic complaint)	7	8	9	
Wait Time (Minutes)				0.23
Mean	87.90	86.55	60.19	
Standard Deviation	77.80	63.71	43.82	
Median	69.00	76.50	45.00	

Table 2

m-YPAS Scores Analyzed Sample (n=113)

Group	Summary Statistic	m-YPAS Score (T1)	m-YPAS Score (T2)	m-YPAS Score (T3)
Control (n=29)	Mean	26.9	26.1	25.5
	95% CI	25.0–28.8	24.2–27.9	24.2–26.8
	SD	5.0	4.9	3.4
Child Life (n=41)	Mean	27.9	23.8	24.4
	95% CI	26.2–29.6	23.2–24.5	23.6–25.3
	SD	5.4	2.2	2.7
Clown (n=43)	Mean	26.6	25.2	25.6
	95% CI	25.2–28.0	24.2–26.2	24.5–26.6
	SD	4.6	3.1	3.4

Table 3

m-YPAS Scores (Sub-Sample n=56)

Group	Summary Statistic	mYPAS Score (T1)	mYPAS Score (T2)	mYPAS Score (T3)
Control (n=13)	Mean	31.4	29.2	26.5
	95% CI	28.9–33.9	25.6–32.7	24.2–28.7
	SD	4.2	5.8	3.8
Child Life (n=24)	Mean	31.3	24.4	25.0
	95% CI	29.4–33.3	23.3–25.6	23.7–26.4
	SD	4.6	2.7	3.2
Clown (n=19)	Mean	31.0	27.0	27.5
	95% CI	29.3–32.6	25.2–28.7	25.7–29.4
	SD	3.4	3.6	3.8