

# Predictors of parental anxiety in a paediatric emergency department

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## ABSTRACT

**Background** Children experience significant anxiety in the paediatric ED. Although research from preoperative and primary care samples indicates that parents experience anxiety surrounding their children's medical procedures, less is known about parental anxiety and factors that contribute to higher parental anxiety in the ED. This study aimed to assess parental anxiety in families presenting to a paediatric ED with a variety of presenting concerns and examine demographic and psychological factors associated with parental anxiety. **Methods** This cross-sectional study included parents of children <18 years old presenting to a paediatric ED in Orange County, California, USA, for a non-psychiatric complaint between 20 January 2021 and 26 March 2021. Parents were, on average, 34.76±9.10 years old, 87.5% were mothers, 59.2% identified as non-Latinx and parents reported average levels of mental health (T-score=51.21±9.84). Parent state anxiety was assessed via the State-Trait Anxiety Inventory and validated instruments were used to measure child temperament (ie, *emotionality, activity, sociability, shyness*), previous medical anxiety, and parent physical and mental health. Data were analysed using multiple linear regression models.

**Results** Out of 201 families screened, 150 were eligible, and 120 enrolled. In the sample, 42.5% of parents endorsed clinically significant levels of anxiety in the ED. Regression analyses indicated that lower child activity temperament (ie, tendency to be less active/energetic;  $B=-3.20$ , 95% CI  $-5.70$  to  $-0.70$ ,  $p=0.012$ ) and poorer parent mental health ( $B=-0.31$ , 95% CI  $-0.52$  to  $-0.09$ ,  $p=0.006$ ) were independently associated with higher parent anxiety ( $F(5, 99)=6.77$ ,  $p=0.004$ ).

**Conclusion** Over 40% of parents sampled endorsed clinically significant anxiety in the paediatric ED. Child temperament, specifically lower activity temperament, and poorer parental mental health were identified as contributors to parent anxiety, whereas clinical condition or severity did not influence parent anxiety. Current results may help identify families in need of additional intervention and may improve patient outcomes.

## INTRODUCTION

Each year, millions of children receive acute care in paediatric EDs.<sup>1</sup> Families often present to the ED following a distressing event or injury or new onset of symptoms. Factors related to the urgent need for care, the ED environment and anticipation of invasive procedures all likely contribute to the significant anxiety observed in children in the ED.<sup>2-4</sup> High levels of anxiety in medical settings

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ The paediatric ED can be a distressing environment for patients and families.
- ⇒ Parent anxiety is often cited as a contributor to child and parent outcomes surrounding medical procedures, but data are lacking on parental anxiety in the paediatric ED.

## WHAT THIS STUDY ADDS

- ⇒ This cross-sectional study included a diverse sample of families presenting to a paediatric ED, and 42.5% of parents endorsed experiencing clinically significant anxiety in the ED.
- ⇒ Results indicated that poorer parental mental health and low child activity temperament were independently associated with higher parent anxiety in the paediatric ED, whereas clinical condition or severity did not influence parent anxiety.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ The expansion of paediatric ED screening to include an assessment of parent anxiety should be considered to help identify families in need of additional intervention.

represent a significant concern as medical distress has been linked to procedural pain and future negative behavioural and clinical outcomes in the paediatric medical literature.<sup>5 6</sup>

Previous research from preoperative and primary care samples indicate that parents experience considerable anxiety surrounding their children's medical procedures and high parental anxiety is associated with high child anxiety.<sup>7-9</sup> Less is known about parental anxiety and factors that may contribute to higher parental anxiety in the paediatric ED. A recent review on distress in caregivers of both adult and paediatric patients indicated a dearth of data on parental anxiety in the paediatric ED, with existing limited data drawn from samples restricted to specific procedures (eg, venipuncture, lumbar puncture, resuscitation), presenting concerns (eg, fever, assault), and limited age ranges, and a lack of data from ethnically and racially diverse samples.<sup>10</sup> The lack of data on parental anxiety and factors associated with parental anxiety in diverse samples of families presenting to the ED limits our ability to develop generalisable interventions that may benefit these families.

The current study aimed to assess parental anxiety in the ED in an ethnically diverse sample of families presenting to a paediatric ED with a variety of chief complaints, and to examine demographic and psychological factors that may be associated with parental anxiety. Research from other medical settings have identified that child age, child temperament and parental mental health are associated with anxiety surrounding medical procedures.<sup>9 11–13</sup> As such, we examined associations among demographics, child temperament, parent mental health and parental anxiety in the ED.

## METHODS

### Design and participants

This cross-sectional study was conducted in a level I paediatric trauma centre ED in south-western USA. A convenience sample was enrolled based on availability of research personnel between 20 January 2021 and 26 March 2021. Families were eligible to participate if the child was less than 18 years old and the child and parent were fluent in English. Families were excluded if the child was admitted to an inpatient floor, had a previous ED visit within 30 days, tested positive for COVID-19, had a psychiatric chief complaint, or a cognitive impairment or developmental delay as these factors may impact parent anxiety.

### Measures

Parent and child demographics, including age, race, ethnicity, gender, relationship to child and education, were collected via parent report.

Chief complaint, emergency severity index (ESI) and procedure data were obtained from the electronic medical record.

### Child previous medical anxiety

Parents reported child previous medical anxiety using a Visual Analogue Scale (VAS), which asks parents to rate their child's level of anxiety at previous medical visits along a 100 mm horizontal line with anchors of 'not anxious' to 'very anxious'.<sup>14</sup> The VAS is an established, validated measure and has been widely used to assess medical anxiety.<sup>15 16</sup>

### Child temperament

Parents reported child temperament via the parent-reported Emotionality Activity Sociability Temperament Survey,<sup>17</sup> which is a well-validated, 20-item measure that includes four subscales: *Emotionality*, *Activity*, *Sociability*, *Shyness*. Parents were asked to rate their child's typical behaviour on a 5-point, Likert-type scale. Higher scores indicated higher baseline emotionality, activity, sociability or shyness temperament.

### Parent health

Parents' self-reported health-related quality of life using the Short-Form Health Survey (SF-12).<sup>18</sup> The SF-12 includes 12 items and produces *Physical Health* and *Mental Health* component scores, which were used for analyses. Total scores are converted to T-scores with a mean of 50 and SD of 10, with higher scores indicating better health.

### Parent state anxiety in the ED

Parents reported current, state anxiety via the *State* portion of the State-Trait Anxiety Inventory (STAI),<sup>19</sup> which is a self-report measure that includes 20 items that assess situational, or state anxiety. The STAI has good reliability and is well validated. Total scores range from 20 to 80, with scores  $\geq 40$  indicating clinically significant symptoms of state anxiety.<sup>19–21</sup>

## Procedures

Trained research personnel approached families after triage in the paediatric ED. After completing informed consent procedures, parents completed study questionnaires on a tablet via REDCap. Study questionnaires were completed after admission into the ED and before treatment procedures.

## Analyses

Statistical analyses were conducted using IBM SPSS Statistics for Windows, V.27.0 (NY:IBM Corp, Armonk, NY, USA). Descriptive analyses were conducted to characterise the sample. Multiple imputation using 10 imputations was used to impute missing values under the conditions of missing completely at random. Imputation was carried out using the fully conditional specification algorithm imputation method in SPSS, which uses a regression-based, multi-pattern approach.<sup>22</sup> The imputation model included demographic (child age, child gender, parent age, parent ethnicity), clinical (Emergency Severity Index, chief complaint category) and the primary study variables (child previous medical anxiety, child temperament, parent physical and mental health, and parent anxiety). Primary variables were either positively or negatively skewed and resistant to transformation. As such, non-parametrical correlational analyses and mean difference tests using imputed values were conducted to examine bivariate associations among child and parent variables and parent anxiety. Variables that were significantly associated with parent anxiety were included in a subsequent multiple linear regression model to examine independent effects on parent anxiety in the ED. Regression assumptions of residual normality, linearity and homoscedasticity were met, and multicollinearity diagnostics indicated that all tolerances were  $>0.99$  and all variance inflation factors (VIFs) were  $<1.01$ . A prior power analysis, conducted using G\*power,<sup>23</sup> indicated that a sample of 55 participants would yield 95% power to detect a moderate effect ( $f^2 = 0.25$ )<sup>12 24</sup> for a linear multiple regression with up to seven tested predictors. Threshold for statistical significance was  $p < 0.05$ .

## Patient and public involvement

Patients and/or the public were not involved in the design, conduct, or dissemination plans of this research.

## RESULTS

### Sample characteristics and descriptive results

Approximately 1930 potentially eligible families attended the ED during the data collection period. Out of the 201 families screened, 150 were eligible, and 120 enrolled in the study. Reasons for study exclusions and declines are listed in [figure 1](#).

Within the study sample, 87.5% of parents identified as mothers and 40.8% identified as Latino/a. Sample characteristics and descriptive results are displayed in [table 1](#). After imputation, parent anxiety data were available for 105 parents (see [figure 1](#)); of these and 42.5% of parents endorsed clinically significant levels of anxiety in the ED.

### Factors associated with parent anxiety in the ED: bivariate results

Parent anxiety was not significantly associated with child nor parent demographic variables or clinical variables (see [tables 2 and 3](#)). Child previous medical anxiety ( $p=0.012$ ), shy temperament ( $p=0.021$ ) and emotional temperament ( $p=0.042$ ) were significantly positively associated with parent anxiety in the ED, whereas child activity temperament ( $p=0.005$ ) and parental

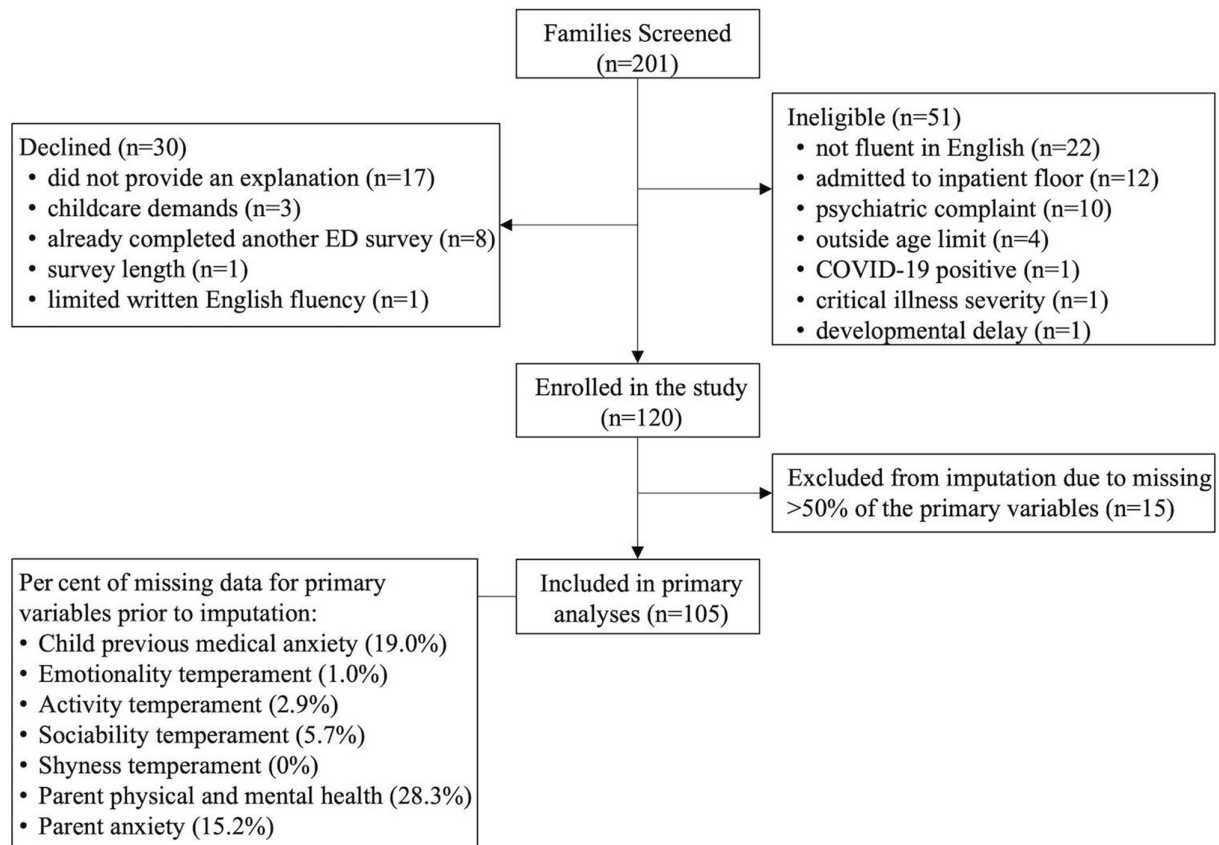


Figure 1 Flow chart of study enrolment.

mental health ( $p=0.004$ ) were negatively associated with parent anxiety (table 3).

### Independent predictors of parent anxiety in the ED: multiple regression results

Child previous medical anxiety, activity, emotional and shyness temperament, and parent mental health were included in a subsequent multiple linear regression to identify variables that explained unique variance in parental anxiety in the ED. In the final regression model (table 4), child activity temperament and parent mental health were the only variables identified as explaining unique variance in parent anxiety ( $R^2_{\text{adj}} = 0.22$ ,  $F(5, 99) = 6.77$ ,  $p=0.004$ ). Results indicated that one unit increase in, or improved, parent mental health was associated with a 0.31 decrease in parent anxiety ( $B=-0.31$ ,  $p=0.006$ , 8.4% unique variance), and a one unit increase in activity temperament was associated with a 3.20 decrease in parent anxiety ( $B=-3.20$ ,  $p=0.012$ , 5.3% unique variance).

### DISCUSSION

In a diverse sample of families presenting to a paediatric ED, 42.5% of parents endorsed clinically significant levels of state anxiety in the ED. Initial correlational analyses indicated that children who exhibited high levels of anxiety in previous medical encounters, children with temperaments high in shyness and emotionality and lower in activity, and poorer parental mental health were associated with higher parent anxiety in the ED. Subsequent multivariate regression analyses revealed that child activity temperament and parental mental health were the only factors independently associated with parental anxiety in the ED.

Child temperament plays a role in how children experience and react to their environment and activity temperament reflects a tendency to be energetic and more physically active.<sup>25</sup> Low activity temperament has been linked to internalising problem behaviours, social anxiety and higher child preoperative anxiety,<sup>9 11 12</sup> whereas high activity temperament is associated with being more distractible and engaged with the environment.<sup>26</sup> In the current study, the associations between child temperament and parent anxiety are in line with findings from the paediatric perioperative literature, which has indicated associations between child activity and shyness temperament and parent preoperative anxiety.<sup>8 11 12</sup> In multiple regression analyses, only child activity temperament had a significant independent association with parent anxiety, with the direction of effect indicating that parents of children with lower activity temperament may exhibit higher state anxiety in the ED. Parents of children with higher activity temperament in the current sample may have expected their children to better tolerate the ED environment which in turn may have affected their own anxiety level.

Parent general mental health also had an independent effect on parent anxiety in the ED. Previous research has demonstrated that parental trait anxiety is associated with state anxiety surrounding medical procedures;<sup>7-9</sup> however, the current findings suggest that overall quality of mental health may be an important contributor to parent distress in the ED. Parent mental health has been shown to influence both child's and parent's acute medical distress and outcomes postdischarge surrounding outpatient and inpatient medical care.<sup>9 27</sup> Further, research examining outcomes surrounding paediatric critical illness or injury care suggests that child and parent outcomes are more strongly associated with parent pre-existing stress and/or

**Table 1** Sample descriptive characteristics

Variable	Mean (SD)	N (%)
Parent age	34.76 (9.10)	
Relationship to child		
Mother		105 (87.5)
Father		12 (10.0)
Other		3 (2.5)
Parent ethnicity		
Non-Latinx		71 (59.2)
Latinx		49 (40.8)
Parent race		
African American, black		4 (3.3)
American Indian, Alaskan Native		1 (0.8)
Asian, Pacific Islander		15 (12.5)
White		63 (52.5)
Multi-racial		8 (6.7)
Other		16 (13.3)
Unknown, prefer not to answer		13 (10.8)
Parent years of education	14.17 (2.64)	
Child age	6.11 (5.22)	
Child gender (% female)		63 (52.5)
Insurance		
Government/public		65 (54.6)
Commercial/private		52 (43.7)
Military		2 (1.7)
Emergency Severity Index		
1		0 (0.0)
2		20 (16.7)
3		72 (60.0)
4		21 (17.5)
5		6 (5.0)
Invasive procedure (yes)		66 (55.0)
Chief complaint category		
Medical		64 (53.8)
Pain (injury)		31 (26.1)
Pain (non-injury)		24 (20.2)
Child previous medical anxiety (range 0–100)	40.93 (30.08)	
Child temperament		
Emotionality (range 1–5)	2.52 (1.02)	
Activity (range 1–5)	3.93 (0.84)	
Sociability (range 1–5)	3.44 (0.82)	
Shyness (range 1–5)	2.60 (0.97)	
Parent physical health (range 0–100)	42.16 (5.97)	
Parent mental health (range 0–100)	51.21 (9.84)	
Parent anxiety in the ED (range 20–80) *	37.33 (10.29)	
*Parent Anxiety Scores $\geq 40$ indicate clinically significant symptoms of state anxiety		

mental health functioning and parents' level of distress during medical care, and are less likely to be associated with severity of illness or type of treatment,<sup>28</sup> which coincides with the current findings from a paediatric ED sample.

Study limitations should be considered when interpreting the current results. The cross-sectional design of this study limits our ability to make conclusions surrounding causality as well as the effect of study variables on clinical outcomes. Future work would benefit from incorporating longitudinal designs. The study included an ethnically and clinically diverse sample; however, the sample size, the exclusion of patients admitted to an inpatient floor, and the exclusion of parents that were not fluent in

**Table 2** Parent anxiety across demographic and clinical variables

Variable	Parent anxiety mean (SD)	P value
Parent ethnicity		0.13
Latinx	36.53 (9.75)	
Non-Latinx	39.84 (11.53)	
Parent race		0.61
African American, black	36.50 (4.73)	
American Indian, Alaskan native*	50.00 (–)	
Asian, Pacific Islander	35.75 (10.99)	
White	39.30 (10.08)	
Multi-racial	39.43 (11.59)	
Other	35.33 (10.74)	
Unknown, prefer not to answer	35.10 (9.81)	
Child gender		0.53
Female	38.53 (9.95)	
Male	37.18 (11.02)	
Chief complaint		0.11
Medical	39.61 (10.49)	
Pain (injury)	35.51 (10.54)	
Pain (non-injury)	36.46 (9.87)	
*n=1, SD not calculated		

English limits the generalisability of the study findings. Future research including families not fluent in English is needed. In addition, the variability in clinical conditions and severity may have limited within-group analyses or detection of significant group differences. Patients with an ESI of 1, or those requiring immediate life-saving intervention, were excluded from this study due to the immediate need for intervention and inability to complete study procedures prior to treatment. Current results may not generalise to parents of children with an ESI of 1 as these parents may present with higher levels of anxiety given the level of severity and nature of treatment. Moreover, participating parents' level of anxiety in the ED may have influenced study participation or responses to study questionnaires which may have implications for selection or response bias and generalisability of the current results. Finally, the considerable proportion of missing data for some of the primary variables may have implications for risk of bias.

In conclusion, parent medical distress is often cited as playing an important role in child and parent outcomes surrounding medical procedures, but parent distress and mental health is understudied in the paediatric ED. The current study assessed parental anxiety in an ethnically and clinically diverse sample of families presenting to a paediatric ED. Over 40% of parents endorsed experiencing clinically significant anxiety in the ED. Child temperament and parental mental health were associated with parental anxiety, whereas clinical condition or severity did not influence parental anxiety in the ED. Study findings, specifically the prevalence of high parental anxiety, highlight a need to consider parental mental health in the ED and may inform the expansion of universal screening in the paediatric ED to include an assessment of parental anxiety. An important next step will be to develop a clinically feasible screening tool to assess these constructs in the ED setting. In addition, future work is needed to assess the impact of high levels of parental anxiety on post-discharge outcomes such as parental satisfaction, adherence to home treatment plans and clinical recovery. These next steps align with the recommendations of the American Academy of Pediatrics and American College of Emergency Physicians to increase mental health screening tools and resources in the ED



**Table 3** Factors associated with parent anxiety: correlation results

Variable	1	2	3	4	5	6	7	8	9	10	11
1.Parent anxiety in the ED											
2.Child age	0.01										
3.Parent age	0.06	0.53**									
4.Parent years of education	0.06	-0.06	0.37**								
5.Emergency/illness severity	-0.19	0.13	0.13	-0.14							
6.Child previous medical anxiety	0.25**	0.07	0.08	0.08	-0.05						
7.Child emotional temperament	0.21*	-0.14	-0.15	-0.16	-0.12	0.41**					
8.Child activity temperament	-0.29**	-0.14	-0.03	0.15	0.09	-0.01	-0.31**				
9.Child social temperament	-0.09	-0.05	0.03	0.20	0.03	-0.03	-0.19	0.47**			
10.Child shy temperament	0.25*	0.05	0.01	-0.22*	-0.02	0.19	0.46**	-0.43**	-0.46**		
11.Parent physical health	-0.01	0.22	0.28*	0.19	-0.06	0.21	-0.06	0.13	0.10	-0.10	
12.Parent mental health	-0.34**	-0.18	-0.11	-0.03	0.04	-0.20	-0.22*	0.05	-0.09	-0.12	-0.28

N=105 for all correlation coefficients; \*p<0.05; \*\*p<0.01.

**Table 4** Independent predictors of parent anxiety: multiple regression results

	R <sup>2</sup> <sub>Adj</sub>	B (95% CI)	SE	T	P
Model	0.22				0.004
Child previous medical anxiety		-0.08 (-0.002 to 0.15)	0.04	1.92	0.055
Emotional temperament		-0.71 (-10.95 to -1.28)	1.28	0.60	0.550
Activity temperament		-3.20 (-5.70 to -0.70)	0.15	-2.51	0.012
Shy temperament		1.06 (-1.45 to 3.56)	1.27	0.83	0.410
Parent mental health		-0.31 (-0.52 to -0.09)	0.11	-2.83	0.006

and with other work demonstrating acceptability and feasibility of implementing universal patient mental health screening in the paediatric ED.<sup>29–31</sup> Further, the use of automated screening that can be integrated into the electronic medical record may improve efficiency. Collectively, this work incorporates a more family centred care approach that may provide an opportunity for early intervention and improved quality of care and clinical outcomes in the paediatric ED.

**Correction notice** This article has been amended since it was first published. An additional affiliation has been added for the last author.

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**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** This study involves human participants and was approved by the institutional review board at the Children's Hospital of Orange County (Protocol ID: #1910121). Participants gave informed consent to participate in the study before taking part.

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