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WPTC PAPERS

Child physical abuse and COVID-19: Trends from nine pediatric trauma centers



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ABSTRACT

Background: Economic, social, and psychologic stressors are associated with an increased risk for abusive injuries in children. Prolonged physical proximity between adults and children under conditions of severe external stress, such as witnessed during the COVID-19 pandemic with “shelter-in-place orders”, may be associated with additional increased risk for child physical abuse. We hypothesized that child physical abuse rates and associated severity of injury would increase during the early months of the pandemic as compared to the prior benchmark period.

Methods: We conducted a nine-center retrospective review of suspected child physical abuse admissions across the Western Pediatric Surgery Research Consortium. Cases were identified for the period of April 1–June 30, 2020 (COVID-19) and compared to the identical period in 2019. We collected patient demographics, injury characteristics, and outcome data.

Results: There were no significant differences in child physical abuse cases between the time periods in the consortium as a whole or at individual hospitals. There were no differences between the study periods with regard to patient characteristics, injury types or severity, resource utilization, disposition, or mortality.

Conclusions: Apparent rates of new injuries related to child physical abuse did not increase early in the COVID-19 pandemic. While this may suggest that pediatric physical abuse was not impacted by pandemic restrictions and stresses, it is possible that under-reporting, under-detection, or delays in presentation of abusive injuries increased during the pandemic. Long-term follow-up of subsequent rates and severity of child abuse is needed to assess for unrecognized injuries that may have occurred.

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Abbreviations

SIP shelter in place

WPSRC Western pediatric surgery research consortium

1. Introduction

Child physical abuse is a leading cause of injury and death in early childhood. The Department of Health and Human Services has estimated that 1750 children die from abuse each year [1]. It is commonly accepted that increased stressors are associated with a rise in child physical abuse. For example, in 2009, there was an

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increase in child maltreatment associated with the great recession [2].

The first confirmed case of COVID-19 in the United States was on January 20, 2020 [3]. The stress that the pandemic imposed upon society was unlike anything in recent history. Although the states were diverse in their response to this pandemic, public health interventions such as shelter in place (SIP) orders were implemented in order to slow viral transmission. During this time, overall trauma admissions decreased at several adult trauma centers [4–6]. More parents were working from home or unemployed while caring for children that were out of school or daycare. While SIP orders by nature create opportunity for greater family time and possibly increased family closeness, stressors also have the potential to negatively impact family dynamics and functionality [7,8].

The purpose of this study was to examine the rate of abusive injury and associated severity of injury early in the pandemic. The hypothesis was that child physical abuse would increase during the early months of the pandemic with the initiation of SIP orders across multiple states.

2. Methods

This study examined a retrospective cohort of children admitted to the nine hospitals of the Western Pediatric Surgery Research Consortium (WPSRC) with injuries sustained as a result of child physical abuse. Inclusion criteria were all pediatric patients < 18 years from January through June in 2019 and 2020. All patients with possible child abuse were abstracted from our trauma registries. Child abuse specialists at each institution then validated abuse or highly suspicious of abuse to create an accurate cohort of patients. We excluded cases of neglect. We compared cases occurring during the early phases of the pandemic (April 1–June 30, 2020) to the same pre-pandemic time period in 2019. January through March of both years served as controls. While individual states differed, all states in the Consortium had some version of a SIP order by April 1, 2020 and accordingly, this was considered the start of our study.

Demographic variables, injury characteristics, and outcomes were abstracted from institutional trauma registries. Demographics included age, gender, race, ethnicity, insurance, and rurality. Specific injury-related characteristics included Glasgow Coma Scale (GCS), body region-specific Abbreviated Injury Scale (AIS) severity scores, Injury Severity Scores (ISS), and procedures performed. The primary outcome of this study was incidence of new injuries sustained as a result of child physical abuse. Secondary outcomes included length of stay, intensive care unit length of stay, discharge disposition, and mortality. Institutional Review Board approval was obtained from each institution.

Descriptive statistics were summarized for continuous variables with mean (SD) as well as medians and interquartile ranges for non-normal data. Categorical variables were tabulated with frequencies and proportions. Year group differences were tested via Kruskal-Wallis or Fisher's Exact tests. A generalized linear model with a negative binomial link and random effects for hospital was used to determine the effect of COVID-19 period on case counts. Significance was set at 0.05. R version 3.4.1 software (R Foundation for Statistical Computing, Vienna, Austria, <http://www.R-project.org/>) and SAS software 9.4 (SAS Institute Inc, Cary, North Carolina) were utilized for statistical analyses.

3. Results

A total of 319 cases of child abuse were reviewed during the study period from January–June in both 2019 and 2020. There were 69 cases of abuse during the COVID-19 cohort in April–June of 2020. We compared this cohort to the same time period in 2019

and also January–March of 2019 and 2020. The median number of aggregated child physical abuse admissions per month overall and raw counts by hospital can be seen in Fig. 1. There was no significant difference in total number of child physical abuse cases or cases per hospital in the COVID-19 pandemic compared to the 2019 baseline pre-COVID time period and other time periods when tested in the generalized linear model ($p = 0.41$).

There were no differences in demographics across the time periods. Specifically, there was no difference in terms of age, gender, ethnicity, race, insurance, rurality, GCS, ISS, or prehospital arrest. There were no differences in outcomes across the time periods. Specifically, there were no significant differences in hospital length of stay, ICU length of stay, procedures, disposition, or mortality (Table 1).

4. Discussion

The economic, social, and psychologic impacts of COVID-19 remain to be fully characterized. There have been increased reports of violence, domestic abuse, and child abuse surrounding the pandemic [9]. Johns Hopkins published an early report of a two-fold increase in child physical abuse in the month following SIP orders in the state of Maryland. This study was only one month at a single institution with very small numbers [10]. It is not clear if that trend continued. Despite published articles and media concerns of increasing frequency of child physical abuse, our nine pediatric trauma centers did not see these results in the early months of COVID-19. We saw no differences in the total number of abuse cases per trauma center or as a consortium of nine children's hospitals. We saw no significant differences in the types of injuries or outcomes. Our results are not unique, they were repeated in a study out of Brazil that also saw no increase in child abuse cases admitted to the hospital during the early pandemic compared to 2019 [11]. Additionally, a study looking at the Pediatric Health Information System (PHIS) database documented a decrease in abusive head trauma admitted to 49 hospitals during the pandemic [12]. These results may not be encouraging.

The possibility exists that a silent pandemic of abuse still occurred. Shelter in place orders limit exposure to mandatory reporters such as school teachers and daycare providers [13]. One recent report documents a 27% reduction in calls to child abuse hotlines following COVID-19 induced school closures in the state of Florida [14]. There is also concern that families have been reluctant to present to hospitals because of the perceived risk of contracting COVID-19. It is possible that maltreatment has been underrecognized.

Our study is limited by the retrospective nature of the review but strengthened by our numbers and broad reach across the Western Pediatric Surgery Research Consortium. Our results were unexpected but may not tell the whole story of child maltreatment during the COVID-19 pandemic. We only evaluated the first three months of the pandemic and only evaluated children admitted to the hospital. Children have had reduced exposure to mandatory reporters owing to SIP orders. There is still the possibility that child maltreatment has increased during the pandemic. It is likely that we have not yet seen the full extent of the pandemic's impact on child physical abuse, and this topic needs continued surveillance and attention.

Declaration of Competing Interest

There are no conflicts of interest.

Table 1
Demographics and Outcomes by year and month category.

	Jan–Mar 2019 (N = 73)	Apr–June 2019 (N = 85)	Jan–Mar 2020 (N = 87)	Apr–June 2020 (N = 74)	p value
Transfer in	48 (65.8%)	53 (62.4%)	52 (59.8%)	45 (60.8%)	0.878
Age months					0.431
Median (Q1,Q3)	6.00 (2.00, 16.00)	7.00 (3.00, 19.00)	5.00 (2.00, 23.00)	9.50 (2.00, 29.75)	
Min	0.00	0.00	0.00	0.00	
Max	192.00	192.00	152.00	164.00	
Gender female	23 (31.5%)	39 (45.9%)	34 (39.1%)	30 (40.5%)	0.319
Race					0.108
N-missing	16	9	14	9	
White	32 (56.1%)	48 (63.2%)	34 (46.6%)	43 (66.2%)	
African American	5 (8.8%)	10 (13.2%)	8 (11.0%)	2 (3.1%)	
Other/multiracial	14 (24.6%)	12 (15.8%)	24 (32.9%)	16 (24.6%)	
Asian	1 (1.8%)	2 (2.6%)	4 (5.5%)	4 (6.2%)	
Pacific Islander/Hawaiian	1 (1.8%)	1 (1.3%)	1 (1.4%)	0 (0.0%)	
American Indian	4 (7.0%)	3 (3.9%)	2 (2.7%)	0 (0.0%)	
Ethnicity					0.158
Hispanic	22 (30.1%)	24 (28.2%)	38 (43.7%)	31 (41.9%)	
Non-Hispanic	45 (61.6%)	56 (65.9%)	43 (49.4%)	35 (47.3%)	
Unknown	6 (8.2%)	5 (5.9%)	6 (6.9%)	8 (10.8%)	
Insurance					0.897
Commercial	18 (24.7%)	21 (24.7%)	24 (27.6%)	15 (20.3%)	
Medicaid	51 (69.9%)	56 (65.9%)	57 (65.5%)	56 (75.7%)	
Govt	1 (1.4%)	2 (2.4%)	1 (1.1%)	0 (0.0%)	
Selfpay	2 (2.7%)	4 (4.7%)	5 (5.7%)	3 (4.1%)	
Other	1 (1.4%)	2 (2.4%)	0 (0.0%)	0 (0.0%)	
Rural or Urban					0.265
N-Missing	4	3	10	5	
Urban	50 (72.5%)	69 (84.1%)	61 (79.2%)	51 (73.9%)	
Rural	19 (27.5%)	13 (15.9%)	16 (20.8%)	18 (26.1%)	
Prehospital Cardiac Arrest					0.608
N-Missing	4	3	10	4	
No	64 (92.8%)	78 (95.1%)	75 (97.4%)	67 (95.7%)	
Yes	5 (7.2%)	4 (4.9%)	2 (2.6%)	3 (4.3%)	
ED Hypotension					0.337
N-Missing	16	9	14	10	
No	56 (98.2%)	75 (98.7%)	72 (98.6%)	60 (93.8%)	
Yes	1 (1.8%)	1 (1.3%)	1 (1.4%)	4 (6.2%)	
ED tachycardia					0.002
N-Missing	8	6	13	7	
No	64 (98.5%)	77 (97.5%)	62 (83.8%)	61 (91.0%)	
Yes	1 (1.5%)	2 (2.5%)	12 (16.2%)	6 (9.0%)	
ED GCS					0.407
N-Missing	4	4	2	2	
Median (Q1,Q3)	15.00 (9.00, 15.00)	15.00 (14.00, 15.00)	15.00 (15.00, 15.00)	15.00 (14.00, 15.00)	
Min	3.00	3.00	3.00	3.00	
Max	15.00	15.00	15.00	15.00	
ISS					0.038
N-Missing	0	0	0	2	
Median (Q1,Q3)	11.00 (9.00, 25.00)	10.00 (9.00, 17.00)	9.00 (4.00, 15.00)	10.00 (7.50, 19.75)	
Min	1.00	1.00	1.00	1.00	
Max	42.00	43.00	35.00	75.00	
Perpetrator					0.032
N-Missing	18	10	18	14	
Parent	24 (43.6%)	21 (28.0%)	25 (36.2%)	18 (30.0%)	
Family member	2 (3.6%)	4 (5.3%)	0 (0.0%)	0 (0.0%)	
School/daycare/babysitter	4 (7.3%)	1 (1.3%)	2 (2.9%)	0 (0.0%)	
Other known	0 (0.0%)	6 (8.0%)	3 (4.3%)	5 (8.3%)	
Unknown	25 (45.5%)	43 (57.3%)	39 (56.5%)	37 (61.7%)	
Mortality	5 (6.8%)	2 (2.4%)	2 (2.3%)	3 (4.1%)	0.449
Gastrostomy					0.143
N-Missing	4	3	11	4	
No	68 (98.6%)	78 (95.1%)	72 (94.7%)	70 (100.0%)	
Yes	1 (1.4%)	4 (4.9%)	4 (5.3%)	0 (0.0%)	
Tracheostomy					0.151
N-Missing	4	3	11	4	
No	69 (100.0%)	82 (100.0%)	76 (100.0%)	70 (100.0%)	
Yes	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
ICP monitor					0.151
N-Missing	4	1	5	2	
No	62 (89.9%)	80 (95.2%)	80 (97.6%)	70 (97.2%)	
Yes	7 (10.1%)	4 (4.8%)	2 (2.4%)	2 (2.8%)	
Craniotomy/Craniectomy					0.524
N-Missing	4	3	11	4	

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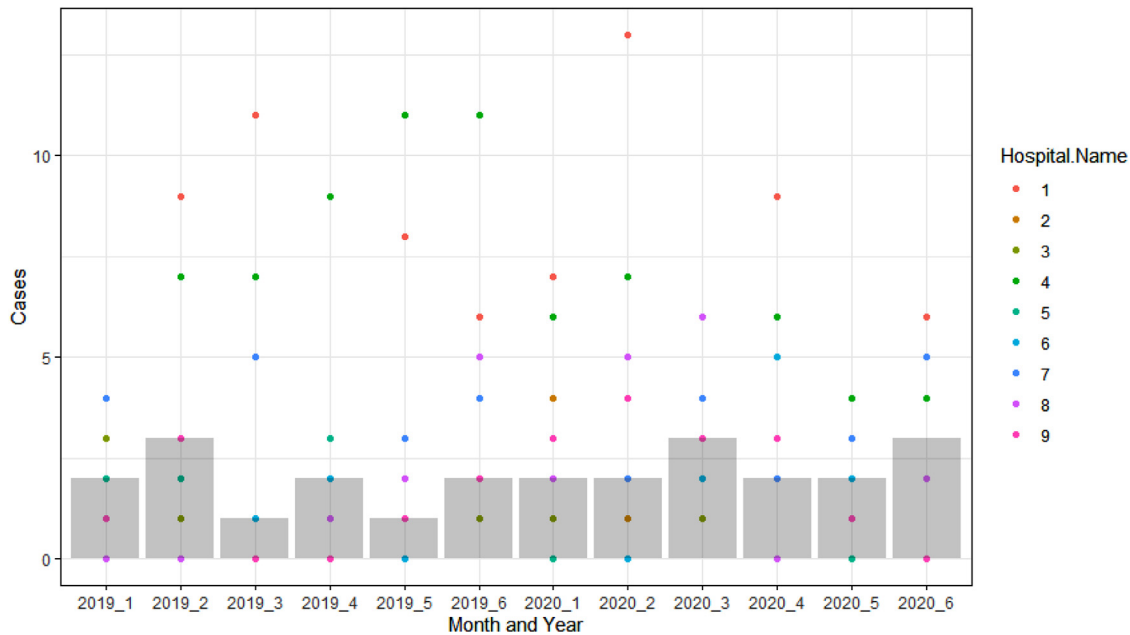


Fig. 1. Cases per month at each hospital. Case counts during April–June 2020 were not significantly different from other observed time periods in 2019–20 ($p = 0.41$).

Table 1 (continued)

	Jan–Mar 2019 (N = 73)	Apr–June 2019 (N = 85)	Jan–Mar 2020 (N = 87)	Apr–June 2020 (N = 74)	p value
No	62 (89.9%)	75 (91.5%)	72 (94.7%)	67 (95.7%)	
Yes	7 (10.1%)	7 (8.5%)	4 (5.3%)	3 (4.3%)	
<i>Hospital LOS</i>					0.804
N-Missing	0	0	5	0	
Median (Q1,Q3)	3.00 (1.00, 8.00)	3.00 (2.00, 8.00)	3.00 (2.00, 7.00)	3.00 (1.00, 6.75)	
Min	0.00	0.00	0.00	0.00	
Max	57.00	92.00	57.00	66.00	
<i>ICU Admission</i>					0.386
ICU Days					0.287
N-Missing	38	44	55	38	
Median (Q1,Q3)	4.00 (2.00, 8.50)	3.00 (1.00, 5.00)	3.00 (1.75, 7.75)	3.00 (2.00, 6.00)	
Min	1.00	1.00	1.00	1.00	
Max	22.00	39.00	36.00	37.00	
<i>Vent Days</i>					0.569
N-Missing	50	69	71	58	
Median (Q1,Q3)	5.00 (3.50, 7.50)	3.50 (2.00, 7.25)	5.50 (3.00, 9.00)	3.50 (2.00, 7.25)	
Min	1.00	1.00	1.00	1.00	
Max	15.00	44.00	22.00	10.00	
<i>Disposition</i>					0.075
N-missing	29	24	39	31	
CPS/foster	16 (36.4%)	22 (36.1%)	17 (35.4%)	17 (39.5%)	
Family member	5 (11.4%)	13 (21.3%)	16 (33.3%)	16 (37.2%)	
Original caregiver	14 (31.8%)	20 (32.8%)	9 (18.8%)	5 (11.6%)	
Long term care	0 (0.0%)	1 (1.6%)	0 (0.0%)	0 (0.0%)	
Rehab	4 (9.1%)	3 (4.9%)	4 (8.3%)	1 (2.3%)	
Family friend	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.3%)	
Death	5 (11.4%)	2 (3.3%)	2 (4.2%)	3 (7.0%)	

CRedit authorship contribution statement

Katie W. Russell: Conceptualization, Visualization, Data curation, Writing – original draft, Writing – review & editing. **Shannon N. Acker:** Conceptualization, Visualization, Supervision, Writing – review & editing. **Romeo C. Ignacio:** Conceptualization, Visualization, Supervision, Writing – review & editing. **Katrine M. Lofberg:** Conceptualization, Visualization, Supervision, Writing – review & editing. **Erin M. Garvey:** Conceptualization, Visualization, Supervision, Writing – review & editing. **Stephanie D. Chao:** Conceptualization, Visualization, Supervision, Data curation, Writing – review & editing. **David W. Bliss:** Conceptualization, Visualization, Supervision, Data curation, Writing – review & editing. **Caitlin A.**

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