

Prevalence and Impact of Traumatic Life Events among Black and White Family Members of Intensive Care Unit Patients

Deepshikha Charan Ashana^{1,2,3}, Joanna L. Hart^{6,7,8}, Kimberly S. Johnson^{1,9}, Ernestine C. Briggs^{4,10}, Alice Parish⁵, Maren K. Olsen⁵, Jennie Jagers¹¹, Greer A. Tiver⁷, Amy Summer⁷, Deepa Ramadurai¹², Nicholas Madamidola⁷, Bassam Syed⁷, Carrie A. Purbeck^{4,10}, Katherine Ramos^{1,3,9}, Muhammed S. Bah³, and Christopher E. Cox¹

¹Department of Medicine, ²Duke-Margolis Center for Health Policy, ³Department of Population Health Sciences, ⁴Department of Psychiatry and Behavioral Sciences, and ⁵Department of Biostatistics and Bioinformatics, Duke University, Durham, North Carolina; ⁶Department of Medicine, ⁷The Palliative and Advanced Illness Research Center, and ⁸Department of Medical Ethics and Health Policy, University of Pennsylvania, Philadelphia, Pennsylvania; ⁹Geriatrics Research Education and Clinical Center, Durham Veterans Affairs Health Care System, Durham, North Carolina; ¹⁰The UCLA/Duke University National Center for Child Traumatic Stress, Durham, North Carolina; ¹¹Indiana State University, Terre Haute, Indiana; and ¹²Department of Medicine, University of Chicago, Chicago, Illinois

ORCID IDs: 0000-0003-2107-2110 (D.C.A.); 0000-0002-4486-0681 (C.E.C.).

Abstract

Rationale: Lifetime trauma is common and may affect interactions with the healthcare system.

Objectives: To measure the prevalence of lifetime trauma and its association with family–clinician interpersonal outcomes in the intensive care unit (ICU).

Methods: A cross-sectional study was conducted in nine ICUs in one urban and one suburban–rural health system. Participants were Black or White surrogate decision makers for mechanically ventilated patients. Independent variables were the number of lifetime traumatic events measured using the Life Stressor Checklist–Revised (LSC-R) and, secondarily and separately, discrimination-related traumatic stress symptoms. The primary outcome was family-reported conflict with ICU clinicians about treatment decisions. Secondary outcomes were family-reported quality of clinician communication and therapeutic alliance.

Results: Among 141 family members (median age, 52.7 yr [interquartile range, 41.9–62.0 yr]; $n = 100$ women [70.9%];

$n = 85$ White [60.3%]; $n = 56$ Black [39.7%]), the median number of lifetime traumatic events was 6.0 (interquartile range, 4.0–9.0). Lifetime trauma was significantly but nonlinearly associated with family–clinician conflict (odds ratio [OR], 1.44 [95% confidence interval (CI), 1.09–1.90] for LSC-R scores of 0–7.5; OR, 0.75 [95% CI, 0.55–1.02] for LSC-R scores of 7.5–16; $P = 0.03$). Discrimination-related stress symptoms were also associated with conflict (OR, 1.04 [95% CI, 1.003–1.07]; $P = 0.03$). Interactions between the independent variables and family member race were not significant, suggesting the effects of lifetime trauma and discrimination-related traumatic stress on family–clinician conflict were similar for Black and White caregivers.

Conclusions: Lifetime trauma is common among families of critically ill patients and is associated with negative experiences of critical care. Trauma-informed care may reduce family–clinician conflict and improve other measures of family experience.

Keywords: critical care; psychological trauma; adverse childhood experiences; racism; communication

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Correspondence and requests for reprints should be addressed to Deepshikha Charan Ashana, M.D., M.B.A., M.S., Department of Medicine, Duke University, 315 Trent Drive, Box 102352, Durham, NC 27710. E-mail: deepshikha.ashana@duke.edu.

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Trauma is a lived or witnessed experience that elicits lasting psychological distress (1). Many events can be experienced as traumatic, including physical or sexual abuse, racism, food insecurity, and physical trauma such as motor vehicle accidents. Pediatric trauma is known as an adverse childhood experience, although trauma can be experienced at any age (2).

Lifetime trauma can increase stress reactivity, which influences how an individual responds to future stressors, such as serious illness (3). This is relevant in intensive care unit (ICU) settings, where stressors abound, such as the threat of disability or death and the use of invasive medical devices and alarms (4). Trauma-informed care is an emerging model of care that hypothesizes that lifetime experiences of trauma may influence how individuals experience health care (4, 5). Empirical evidence to support this hypothesis is limited. However, if true, this would offer a useful framework to select individuals *a priori* to receive supply-limited services (e.g., palliative care, psychological care) that could support them through the stressful circumstances of critical illness.

We hypothesized that lifetime trauma is common among family members of critically ill patients and that lifetime trauma is associated with family-reported family–clinician interpersonal outcomes (e.g., conflict about treatment decisions) (3, 6–8). We also hypothesized that the association between trauma and interpersonal outcomes is magnified among Black compared with White family members because clinicians have disproportionately negative responses to traumatic stress symptoms (e.g., anger, vigilance) among Black individuals (4, 9). Race, in this case, is a proxy for racism (10). To test these hypotheses, we conducted a multicenter, cross-sectional study of Black and White family members of mechanically ventilated patients.

Methods

This study was approved by the appropriate Institutional Review Boards (protocol numbers 00107640 and 843598, and follows the Strengthening the Reporting of Observational Studies in Epidemiology guideline (see Table E1 in the data supplement) (11). A conceptual model has been published (4) and is summarized as a causal directed acyclic graph in Figure E1.

Setting and Participants

Adults (≥ 18 yr of age) who self-identified as Black or White and were surrogate decision makers (referred to here as “family members”) for mechanically ventilated patients from nine medical and/or surgical ICUs in one urban and one suburban–rural health system were eligible for inclusion. Family members without conversational English fluency were excluded because study materials were not available in other languages. Eligible patients were mechanically ventilated for ≥ 48 hours and lacked decisional capacity. One eligible family member per patient was approached while their loved one was admitted to a study ICU between August 2021 and November 2022. All family members provided informed consent.

Independent Variables

The validated and commonly used Life Stressor Checklist–Revised (LSC-R) was the primary independent variable (12–17). It was used to evaluate the occurrence of 23 traumatic events (e.g., physical or sexual abuse, serious illness). Similar survey items were combined to reduce the time burden of study participation and potentially stigmatizing language was modified. Notably, the LSC-R does not evaluate racism or other forms of discrimination (18).

The Trauma Symptoms of Discrimination Scale (TSDS) was a separate and secondary independent variable, used to measure the frequency of 21 traumatic stress symptoms (e.g., vigilance, worry, avoidance, emotional numbness) related to experiences of discrimination (19). A measure of traumatic discrimination events was not available.

Ranges for LSC-R and TSDS scores were 0–23 and 21–84, respectively, with higher scores indicating more traumatic events and traumatic stress. A one-unit increase in LSC-R score indicates an additional traumatic event, while a one-unit increase in TSDS score indicates an additional degree of a discrimination-related traumatic stress symptom (e.g., feeling vigilant “sometimes” vs. “rarely”). The distinction between traumatic events and traumatic stress symptoms is shown in Figure E1.

Outcomes

Outcomes were reported by family members. The primary outcome was conflict with ICU clinicians, chosen because 1) it is common in

ICUs, occurring in up to 40% of family–clinician relationships; 2) it is 50% more common among Black and White families; and 3) it is associated with delayed decision making for critically ill patients, traumatic stress among family members, and moral distress among ICU clinicians (20–23). Conflict was measured using the question “How much disagreement, including conflicts and negative feelings, has there been between you and your ICU doctors regarding your loved one’s care?” with possible responses ranging from 0 (none) to 10 (most imaginable) (24).

The two secondary outcomes were quality of ICU clinician communication and therapeutic alliance with ICU clinicians. Quality of communication was measured using the Quality of Communication Questionnaire summary item “Overall, how would you rate the ICU doctors’ communication with you?” with possible responses ranging from 0 (worst imaginable) to 10 (best imaginable). Therapeutic alliance was measured using an adaptation of the Human Connection Scale, which includes 15 items about clinicians’ interpersonal skills (e.g., listening, honesty, care, trustworthiness), with total possible scores ranging from 15 (no alliance) to 75 (perfect alliance) (25, 26).

Other Variables

Family members completed additional surveys, including the Post-Traumatic Symptom Scale and the Connor-Davidson Resilience Scale, to measure traumatic stress symptoms (e.g., nightmares) and resiliency (e.g., ability to adapt to change) (27, 28). They also provided sociodemographic data. Patient clinical and demographic data were abstracted from the electronic health record.

Data Analysis

Deferred responses (“I prefer not to answer”) to LSC-R items were recoded as nonaffirmative responses (“No”), and surveys with missing responses were excluded from the primary analysis. Two sensitivity analyses with alternative approaches to imputation were undertaken, in which deferred and missing item responses were recoded as either nonaffirmative or affirmative responses. Missing responses to TSDS items were imputed using the mean of all nonmissing responses for that participant. Conflict and quality of communication demonstrated floor and ceiling effects, respectively; thus,

they were transformed into binary variables that can be interpreted as any versus no conflict (scores of 1–10 vs. 0) and suboptimal versus optimal communication (scores of 0–9 vs. 10).

The analysis was guided by hypothesized causal mechanisms, derived from the existing literature and summarized in a directed acyclic graph (see Figure E1) (6, 20, 24, 29). To measure the association of the LSC-R trauma score and conflict, we built three logistic regression models: 1) an unadjusted model with LSC-R trauma score as the only predictor; 2) a model including an interaction term of LSC-R trauma score and family member race and main effects of each; and 3) a serial mediation model to measure the direct effect of LSC-R score on conflict, the indirect effect mediated by traumatic stress symptoms (Post-Traumatic Symptom Scale score), and the percentage of the total effect mediated by traumatic stress symptoms (30). The linearity assumption was assessed by the significance of restricted cubic spline terms and was not met for LSC-R score in the conflict outcome model, with evidence of varying associations below and above a value of 7.5 (31); therefore, a linear spline term was implemented for LSC-R score, with a knot at 7.5 (see Figure E2). To measure the association of LSC-R score and secondary outcomes and TSDS score and all outcomes, we followed the sequence of the first two models described above with logistic or linear regression as appropriate. *P* values ≤ 0.05 were considered to indicate statistical significance.

Results

Family Member and Patient Characteristics

Of 283 eligible family members who were successfully approached for consent, 186 (65.7%) consented to participate. Among those who consented, 141 (80.1%) completed the study. Those who did not complete the study more commonly experienced the death of their critically ill loved ones than those who completed the study ($n = 20$ [58.8%] vs. $n = 64$ [46.0%]) (see Table E2). Family members had a median age of 52.7 years (interquartile range [IQR], 41.9–62.0 yr), and a plurality were women ($n = 100$ [70.9%]), White ($n = 85$ [60.3%]), and the partner of the patient ($n = 58$ [41.1%]). Most family members endorsed sufficient financial resources ($n = 118$ [85.6%]) and social

support ($n = 130$ [93.5%]). Patients had a median age of 62.7 years (IQR, 54.8–68.4 yr), and a majority were men ($n = 76$ [53.9%]), White ($n = 80$ [56.7%]), and seriously ill ($n = 64$ [46.0%] died in the hospital). Comparisons by race are shown in Table 1.

Exposure to Trauma

Family members endorsed a median of 6 (IQR, 4–9) traumatic events in their lifetimes. The most common categories of trauma were the expected or unexpected death of a loved one ($n = 106$ [75.2%] and $n = 74$ [52.5%]), an experienced or witnessed serious disaster or accident ($n = 72$ [51.1%] and $n = 71$ [50.4%]), and the responsibility of caregiving for someone with a serious illness ($n = 61$ [43.3%]) (Table 2). Events that were less common but still experienced by more than one-fourth of family members included the incarceration of a family member ($n = 60$ [42.6%]), the divorce of parents while the individual was living with them ($n = 54$ [38.3%]), their own divorce ($n = 46$ [32.6%]), serious financial problems ($n = 45$ [31.9%]), the loss of a child *in utero* ($n = 41$ [29.1%]), and witnessed violence between family members during childhood ($n = 37$ [26.4%]). The most notable racial difference was that Black compared with White individuals more commonly endorsed the incarceration of a family member ($n = 34$ [60.7%] vs. $n = 26$ [30.6%]).

A majority of family members ($n = 103$ [75.2%]) reported experiencing discrimination in their lifetimes. Among both Black and White family members, the most common forms of discrimination were based on either race or ethnicity ($n = 42$ [77.8%] vs. $n = 16$ [19.3%]), social class ($n = 25$ [46.3%] vs. $n = 27$ [32.5%]), or gender ($n = 14$ [25.9%] vs. $n = 26$ [31.3%]) (Table 3). The median TSDS discrimination-symptoms score was 37.5 (IQR, 28.0–48.0). Black compared with White individuals more commonly reported excessive worry ($n = 35$ [63.6%] vs. $n = 37$ [44.6%]), fears about safety ($n = 33$ [60.0%] vs. $n = 30$ [36.2%]), avoidance of certain situations or people ($n = 24$ [43.6%] vs. $n = 22$ [26.5%]), and vigilance ($n = 23$ [41.8%] vs. $n = 20$ [24.1%]) related to experiences of discrimination (Table 3).

Family-Clinician Interpersonal Outcomes

A total of 26 (18.7%) family members reported conflict, and 53 (38.1%) reported suboptimal communication by clinicians.

Family members provided favorable ratings of therapeutic alliance (median, 72.0 [IQR, 64.0–75.0]). White families more commonly reported conflict and suboptimal communication than Black families (Table 1).

Association of Trauma and Conflict with Clinicians

The LSC-R trauma score was significantly associated with conflict (odds ratio [OR], 1.44 [95% confidence interval (CI), 1.09–1.90] for LSC-R scores of 0–7.5; OR, 0.75 [95% CI, 0.55–1.02] for LSC-R scores of 7.5–16; $P = 0.03$) (Figure 1). This indicates that each traumatic event increased the odds of conflict with clinicians by 44%, up to a threshold of 7.5 traumatic events. In a mediation model, 76.3% of the total effect of the LSC-R trauma score on conflict was indirectly mediated by traumatic stress symptoms. The TSDS discrimination-symptoms score also was significantly associated with conflict (OR, 1.04 [95% CI, 1.003–1.07]; $P = 0.03$). This indicates each additional discrimination-related traumatic stress symptom level (e.g., feeling vigilant sometimes rather than rarely) increased the odds of conflict with clinicians by 4%. Interactions of LSC-R trauma score and TSDS discrimination-symptoms score with family member race were not significant ($P = 0.87$ and $P = 0.70$, respectively).

Association of Trauma and Secondary Outcomes

The LSC-R trauma and TSDS discrimination-symptoms scores were significantly associated with suboptimal communication (ORs, 1.11 [95% CI, 1.004–1.22; $P = 0.04$] and 1.03 [95% CI, 1.004–1.06; $P = 0.03$], respectively) (Figure 1). The interaction between LSC-R score and family member race was significant ($P = 0.01$). The odds of suboptimal communication for a one-point increase in LSC-R trauma score were 0.94 (95% CI, 0.80–1.11) for Black family members and 1.24 (95% CI, 1.08–1.43) for White family members (see Figure E3). This indicates that each traumatic event increased the odds of suboptimal communication by clinicians by 24% for White families only, with no significant effect for Black families.

The LSC-R trauma score was not significantly associated with therapeutic alliance ($\beta = -0.11$ [95% CI, -0.56 to 0.34]; $P = 0.62$), while the TSDS discrimination-symptoms score was significantly associated

Table 1. Characteristics of family members and patients, by race of family member

	FMs*		Patients*		SMD†	SMD†
	Black (n = 56)	White (n = 85)	Black FM (n = 56)	White FM (n = 85)		
Site, n (%)						
1	33 (58.9)	64 (75.3)	33 (58.9)	64 (75.3)	0.35	0.35
2	23 (41.1)	21 (24.7)	23 (41.1)	21 (24.7)		
Age, yr, median (IQR)	51.2 (39.5–61.7)	54.2 (44.0–62.9)	63.0 (54.9–68.4)	62.7 (54.5–68.8)	–0.18	0.19
Female gender, n (%)	38 (67.9)	62 (72.9)	30 (53.6)	35 (41.2)	–0.11	0.25
Race, n (%)						
White	0	85 (100)	0	80 (94.1)		
Black	56 (100)	0	54 (96.4)	0		
Other‡	0	0	2 (3.6)	5 (5.9)		
Hispanic ethnicity, n (%)	1 (1.8)	3 (3.5)	0	2 (2.4)	–0.11	0.36
Insurance type, n (%)						
Medicare	—	—	26 (47.3)	42 (49.4)		
Commercial	—	—	11 (20.0)	29 (34.1)		
Medicaid	—	—	13 (23.6)	2 (2.4)		
None	—	—	2 (3.6)	4 (4.7)		
Other	—	—	3 (5.5)	9 (9.4)		
Number of comorbidities, median (IQR)	—	—	3.0 (2.0–4.0)	2.0 (1.0–3.0)		0.23
APACHE II score, median (IQR)	—	—	21.0 (17.0–26.0)	22.0 (16.0–26.0)		0.02
Discharge disposition, n (%)						
Died in hospital	—	—	25 (46.3)	39 (45.9)		
Post-acute care facility	—	—	17 (31.5)	23 (27.1)		
Home without hospice	—	—	12 (22.2)	21 (24.7)		
Hospice	—	—	0	2 (2.4)		
Palliative care consultation, n (%)	—	—	15 (27.3)	30 (35.3)		–0.17
Relationship to patient, n (%)						
Spouse or partner	—	—	—	—	0.73	—
Child	13 (23.2)	45 (52.9)	—	—		
Parent	24 (42.9)	19 (22.4)	—	—		
Sibling	4 (7.1)	8 (9.4)	—	—		
Friend	10 (17.9)	8 (9.4)	—	—		
Other	0	1 (1.2)	—	—		
Other	5 (8.9)	4 (4.7)	—	—		
Importance of faith, median (IQR)	100 (90.0–100)	90.0 (60.0–100)	—	—	0.32	—
Endorses financial difficulty, n (%)§	10 (18.5)	10 (11.9)	—	—	0.21	—
Level of education, n (%)					0.47	—
No high school	1 (1.9)	2 (2.4)	—	—		
Some or all high school	14 (25.9)	12 (14.1)	—	—		
Some or all college	29 (53.7)	50 (58.8)	—	—		
Advanced degree	10 (18.5)	21 (24.7)	—	—		
Health literacy, median (IQR)¶	14.0 (11.0–15.0)	13.0 (10.0–15.0)	—	—	0.33	—
Support for medical decisions, n (%)¶¶	51 (94.5)	79 (92.9)	—	—	0.44	—
PTSS-10 score, median (IQR)	21.0 (14.0–34.0)	26.5 (16.0–37.0)	—	—	–0.25	—
CD-RISC score, median (IQR)	42.0 (38.0–46.0)	41.0 (36.0–46.0)	—	—	0.13	—
Independent variables						
LSC-R score, median (IQR)	6.0 (4.0–9.0)	6.0 (3.0–8.0)	—	—	0.05	—
TSDS score, median (IQR)	40.0 (32.0–49.0)	36.0 (25.0–47.0)	—	—	0.29	—

(Continued)

Table 1. (Continued)

	FMs*		Patients*		SMD†
	Black (n = 56)	White (n = 85)	Black FM (n = 56)	White FM (n = 85)	
Outcomes					
Any conflict with clinicians, n (%)	8 (14.8)	18 (21.2)	—	—	—
Suboptimal communication with ICU clinicians, n (%)	16 (29.6)	37 (43.5)	—	—	—
Therapeutic alliance, median (IQR)	72.0 (66.0–75.0)	71.0 (64.0–74.0)	—	—	—

Definition of abbreviations: APACHE = Acute Physiology and Chronic Health Evaluation; CD-RISC = Connor-Davidson Resilience Scale; FM = family member; ICU = intensive care unit; IQR = interquartile range; LSC-R = Life Stressor Checklist-Revised; PTSS-10 = Post-Traumatic Stress Symptom Scale; SMD = standardized mean difference; TSDS = Trauma Symptoms of Discrimination Scale.

*Missing data counts are as follows: three for Hispanic patient ethnicity, one for patient insurance type, one for length of ICU stay, two for discharge disposition, one for palliative care consultation, one for family member age, two for importance of faith, three for financial difficulty, two for level of education, two for health literacy, two for support for medical decisions, four for PTSS-10 score, six for CD-RISC score, two for LSC-R score, three for TSDS score, two for conflict with clinicians, two for suboptimal communication with clinicians, and eight for therapeutic alliance.

†Negative SMDs indicate that the Black FM value is lower than the White FM value. SMD values <|0.2| are considered small, those between |0.2| and |0.5| are considered moderate, and those >|0.5| are considered large.

‡Other includes one Asian participant and six participants who preferred not to disclose.

§The question assessing financial difficulty was “At the end of the month, when you are paying the bills, which best describes the way you usually feel?” We combined affirmative responses in these categories: “short on money and need more to pay bills” and “barely have enough to pay bills and for basic things.”

¶For health literacy score, 3 = lowest health literacy and 15 = highest health literacy.

‡‡The prompt assessing support for medical decisions was “I, (family member) feel that I have someone I can turn to for advice about making important decisions (like medical decisions).” We combined affirmative responses for these categories: “definitely true” and “probably true.”

with therapeutic alliance ($\beta = -0.14$ [95% CI, -0.26 to 0.02]; $P = 0.03$) (negative values indicate worse therapeutic alliance) (Figure 1).

Other Analyses

The interaction of LSC-R trauma score and family member race on therapeutic alliance was not significant ($P = 0.58$). Interactions between the TSDS discrimination-symptoms score and family member race were not significant in secondary outcome models ($P = 0.58$, suboptimal communication; $P = 0.08$, therapeutic alliance). Various approaches to imputing deferred and missing LSC-R data did not change the results (see Table E3).

Discussion

In this novel exploration of the impact of trauma on ICU care, family members of mechanically ventilated patients reported a high but expected prevalence of lifetime trauma. Lifetime trauma was significantly associated with negative family-clinician interpersonal outcomes. A majority of this effect was mediated by traumatic stress symptoms. There was no consistent interaction between trauma and family member race, meaning that the effect of trauma on interpersonal outcomes was similar for individuals identifying as Black or White.

Exposure to Trauma and Relevance to Critical Illness

Lifetime trauma was common in this cohort: 75% of family members reported four or more events in their lifetimes, and 25% reported nine or more events. These results are aligned with national estimates of trauma prevalence from the Behavioral Risk Factor Surveillance System (32).

Many of the endorsed traumatic events could have plausible direct impacts on family members’ experiences of critical illness. A majority of study participants had experienced the death of a loved one. Memories of prior deaths may influence future decisions about life-limiting critical illness (33, 34). Two in five participants were caregivers for a person with serious illness. Many caregivers experience tremendous physical and psychological strain (35), which may be amplified during an episode of critical illness that is likely to increase a loved one’s future caregiving needs. Other events suggested

Table 2. Potentially traumatic events experienced during family members' lifetimes, by family member race

Traumatic Event*	Black (n = 56)	White (n = 85)	Total (n = 141)
Someone close died, excluding those who died suddenly or unexpectedly	40 (71.4)	66 (77.7)	106 (75.2)
Someone close died suddenly or unexpectedly (e.g., heart attack)	32 (57.1)	42 (49.4)	74 (52.5)
Experienced a serious disaster or accident (e.g., fire)	30 (53.6)	42 (49.4)	72 (51.1)
Witnessed a serious accident (e.g., on-the-job accident)	29 (51.8)	42 (49.4)	71 (50.4)
Was responsible for taking care of someone close who had a serious physical or mental illness (e.g., cancer)	21 (37.5)	40 (47.1)	61 (43.3)
Close family member was in jail	34 (60.7)	26 (30.6)	60 (42.6)
Parents separated or divorced while respondent was living with them	19 (33.9)	35 (41.2)	54 (38.3)
Was separated or divorced	15 (26.8)	31 (36.5)	46 (32.6)
Had serious money problems (e.g., not enough money for food)	21 (37.5)	24 (28.2)	45 (31.9)
Respondent or their partner had an abortion or miscarriage	18 (32.1)	23 (27.1)	41 (29.1)
Witnessed violence between family members during childhood	16 (28.6)	21 (25.0)	37 (26.4)
Had a serious physical or mental illness (e.g., cancer, suicidal ideation)	10 (17.9)	25 (29.4)	35 (24.8)
Witnessed robbery, mugging, or attack taking place	16 (28.6)	16 (18.8)	32 (22.7)
Experienced robbery, mugging, or physical attack (nonsexual) by stranger	13 (23.2)	13 (15.3)	26 (18.4)
Was emotionally abused or neglected (e.g., frequent shaming)	10 (17.9)	16 (18.8)	26 (18.4)
Experienced abuse or physical attack (nonsexual) by someone they knew	8 (14.3)	17 (20.0)	25 (17.7)
Was bothered or harassed by sexual remarks, jokes, or demands for sexual favors by someone at work or school	6 (10.7)	12 (14.1)	18 (12.8)
Had a child with a serious physical or mental illness	4 (7.1)	12 (14.1)	16 (11.4)
Was touched or made to touch someone in a sexual way under threat of harm	4 (7.1)	10 (11.8)	14 (9.9)
Was unwillingly separated from their child (e.g., loss of custody)	7 (12.5)	3 (3.5)	10 (7.1)
Was put in foster care or adopted	2 (3.6)	7 (8.2)	9 (6.4)
Respondent was in jail	4 (7.1)	3 (3.5)	7 (5.0)
Was physically neglected (e.g., not properly fed)	2 (3.6)	4 (4.7)	6 (4.3)

Data are expressed as *n* (%).

*Deferred response ("Choose not to respond") counts for total, in order of items, were as follows: 2, 3, 0, 1, 2, 4, 1, 5, 2, 4, 3, 2, 0, 0, 5, 4, 2, 3, 2, 2, 1, 1, and 4. These were included in the denominator for calculation of proportions.

disrupted social support networks (e.g., divorce, incarceration) and strained financial resources, both of which are critical to coping with major health events (36, 37). It is not clear that screening for traumatic events, as we did, would be acceptable to family members as part of routine clinical practice. However, our results may suggest a need to systematically evaluate family members' traumatic stress and psychosocial needs to provide personalized supports (e.g., peer support groups in case of limited social support) and, alternatively, to identify and mobilize psychosocial resources when these exist (38).

Trauma and Family–Clinician Interpersonal Outcomes

Lifetime trauma substantially increased the likelihood of negative family–clinician interactions. Each traumatic event increased the odds of conflict with clinicians by 44%, which sums to a much greater odds of conflict in the half of our cohort that experienced up to six traumatic events. This is an important finding because

interpersonal conflict is a modifiable risk factor for delayed decision making for critically ill patients, post-traumatic stress disorder among family members, and moral distress among ICU clinicians (20, 39).

That a majority of the effect of trauma on conflict was mediated by traumatic stress symptoms has mechanistic and operational implications. First, the relevant modifiable mechanism is likely to be clinicians' responses to families' traumatic stress symptoms (e.g., labeling of vigilant families as "difficult") (40, 41). Training clinicians to recognize archetypes of traumatic stress, reframe these as expected, and productively deescalate traumatic stress may be a novel pathway toward supporting the psychological well-being of both families and clinicians (42, 43). Second, screening for traumatic stress symptoms could be incorporated easily into clinical trial or ICU care processes to prioritize family members to receive supportive interventions, such as those that address social needs and support adaptive coping (7, 44–46). In sum, these results may highlight a need for

a trauma-informed approach to ICU care, which was pioneered in mental health (and nonmedical) settings and seeks to counter the traumatic nature of medical care through clinician- and system-level awareness of trauma and appraisal of patient/family strengths (5, 47–49).

We observed a threshold effect of trauma on conflict. There are at least two possible explanations. It may be that individuals who have experienced substantial trauma become numb to additional traumatic stress, such that critical illness may not be perceived as traumatic in the midst of many other stressors (50). Alternatively, those who have experienced substantial trauma may experience greater post-traumatic growth, developing resiliency and robust coping strategies to manage complex interpersonal relationships, such as those with ICU clinicians (51). Qualitative studies are necessary to clarify underlying mechanisms.

Contrary to our hypothesis, the effect of trauma on interpersonal outcomes was not consistently racialized. Although this may be

Table 3. Sources of discrimination and traumatic stress symptoms related to experiences of discrimination, by family member race

	Black (n = 56)	White (n = 85)	Total (n = 141)
Sources of discrimination			
Forms of discrimination, n (%) [*]			
Race/ethnicity	42 (77.8)	16 (19.3)	58 (42.3)
Social class	25 (46.3)	27 (32.5)	52 (38.0)
Gender	14 (25.9)	26 (31.3)	40 (29.2)
Age	13 (24.1)	13 (15.7)	26 (19.0)
Religion	10 (18.9)	12 (14.5)	22 (16.2)
Disability	5 (9.3)	9 (10.8)	14 (10.2)
Other	6 (11.1)	10 (12.1)	16 (11.7)
Sexual orientation	7 (13.0)	5 (6.0)	12 (8.8)
Number of discrimination sources experienced, median (IQR)	2 (1.0–3.0)	1 (0.0–2.0)	1 (1.0–2.0)
Discrimination-related trauma symptoms, n (%) ^{*†}			
Worries too much	35 (63.6)	37 (44.6)	72 (52.2)
Feels the world is an unsafe place	33 (60.0)	30 (36.2)	63 (45.7)
Has trouble relaxing	25 (45.5)	32 (38.6)	57 (41.3)
Tries hard not to think about or be reminded of past experiences of discrimination	24 (43.6)	24 (29.3)	48 (35.0)
Becomes easily annoyed or irritable	23 (41.8)	23 (27.7)	46 (33.3)
Avoids certain situations or speaking to certain people	24 (43.6)	22 (26.5)	46 (33.3)
Avoids activities in which they are the center of attention	16 (29.1)	27 (32.5)	43 (31.2)
Feels constantly on guard, watchful, or easily startled, especially around certain people or place	23 (41.8)	20 (24.1)	43 (31.2)
Fears embarrassment	15 (27.3)	25 (30.1)	40 (29.0)
Feels nervous, anxious, or on edge, especially around certain people	12 (21.8)	28 (33.7)	40 (29.0)
Feels afraid as if something awful might happen	17 (30.9)	23 (27.7)	40 (29.0)
Cannot stop or control worrying	13 (23.6)	26 (31.3)	39 (28.3)
Worst fears include being embarrassed	12 (28.8)	19 (22.9)	31 (22.5)
Feels numb or detached from others, activities, or surroundings	10 (18.2)	16 (19.3)	26 (18.8)
Feels a rush of intense discomfort, and may feel their heart pounding, muscles tense up, or sweat in social situations	10 (18.2)	15 (18.1)	25 (18.1)
Feels so restless that is hard to sit still	12 (21.8)	12 (14.5)	24 (17.4)
Feels isolated and set apart from others	13 (23.6)	8 (9.6)	21 (15.2)
Has nightmares or intrusive thoughts about past experiences of discrimination	7 (12.7)	9 (10.8)	16 (11.6)
Cannot control emotions when thinking about past experiences of discrimination	9 (16.7)	6 (7.2)	15 (11.0)
Feels nervous in social situations, and is afraid people will notice that they are sweating, blushing, or trembling	5 (9.1)	9 (11.0)	14 (10.2)
Fear of social situations creates problems in daily functioning	0 (0.0)	7 (8.4)	7 (5.1)

Definition of abbreviation: IQR = interquartile range.

^{*}All items were missing four responses, except the fifth item, which was missing five responses.

[†]All items were missing three responses, except items 4 and 19–21, which were missing four responses. We combined affirmative responses (“sometimes” and “often”) to each of the discrimination-related trauma symptoms to calculate proportions. All symptoms were in response to the prompt “Please tell us how often you feel this way because of past experiences of discrimination.”

true, another possibility is that Black and White individuals’ expectations of clinicians are different (45). For example, if Black individuals’ expectations of clinical communication are informed by their prior experiences of discrimination, supported by the high frequency of worry and vigilance in this sample, only very poor communication may rise to the threshold of needing to be reported as such in a research survey (45). Another explanation may be that this study was not powered adequately to test interaction effects.

Strengths and Limitations

This study has several strengths, including a racially and geographically diverse sample

and the inclusion of a measure of discrimination-based traumatic stress, which is not a component of common trauma exposure surveys. In addition, the use of a prespecified causal model allowed us to build parsimonious models with a focus on modifiable mechanisms for future interventions.

There are also several limitations. First, although the LSC-R trauma score was an interval variable in our models, some traumatic events may affect the ICU experience more than others. However, our intent was to approximate the overall burden of traumatic stress in an individual’s lifetime, as the relative influence of various types of trauma on healthcare experiences is not known.

Second, there were floor and ceiling effects in two outcomes. This is common in ICU research and may signal the need for more nuanced person-reported measures (52). Although our approach to dichotomizing these variables would be expected to reduce power, we did not observe null results in most analyses of trauma and interpersonal outcomes.

Third, we did not assess clinician perceptions of conflict. However, our focus was on how families experienced critical care, which is an important and valid perspective regardless of whether clinicians corroborate their experiences.

Finally, our results may indicate nonresponse bias, possibly related to virtual

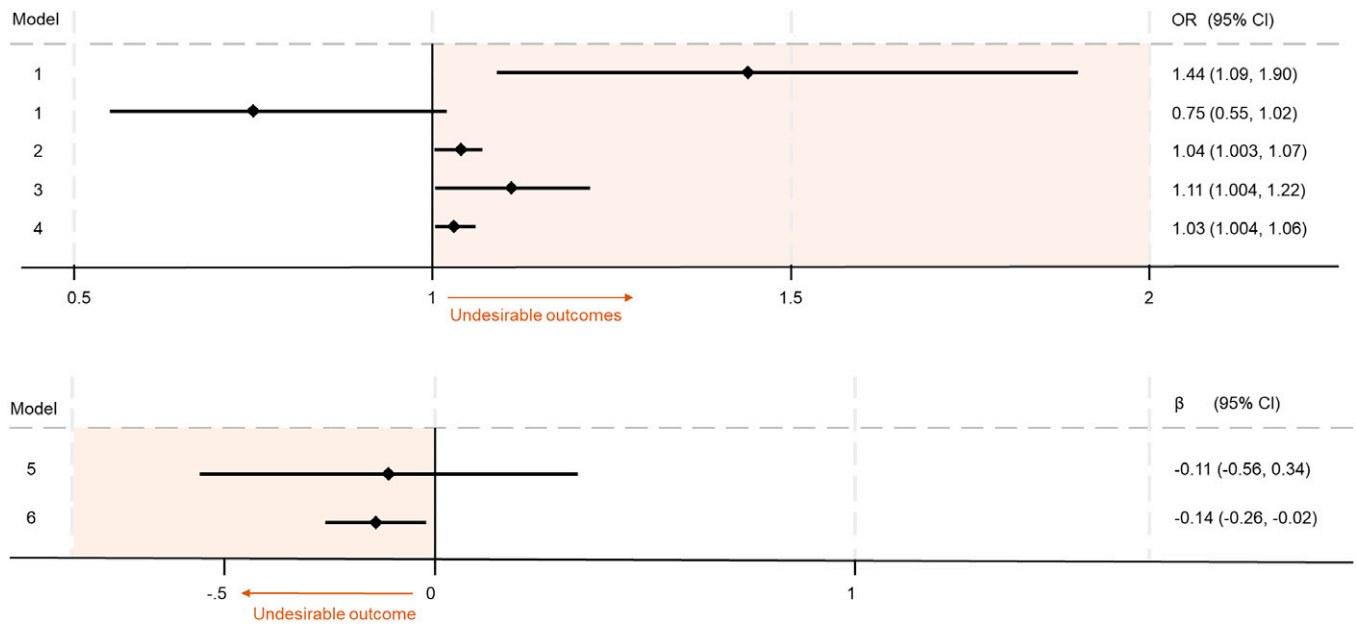


Figure 1. Association of lifetime trauma and family-reported interpersonal outcomes. The top panel of the forest plot displays results of logistic regression models. ORs greater than 1 indicate undesirable outcomes, including conflict with clinicians and suboptimal communication with clinicians. The bottom panel of the forest plot displays results of linear regression models. Beta coefficients less than 0 indicate lower therapeutic alliance with clinicians. Model exposures and outcomes are as follows: model 1 (primary model, first estimate): LSC-R trauma score < 7.5 and any conflict; model 1 (primary model, second estimate): LSC-R trauma score \geq 7.5 and any conflict; model 2: TSDS score and any conflict; model 3: LSC-R trauma score and suboptimal communication; model 4: TSDS discrimination-symptoms score and suboptimal communication; model 5: LSC-R trauma score and therapeutic alliance; and model 6: TSDS discrimination-symptoms score and therapeutic alliance. CI = confidence interval; LSC-R = Life Stressor Checklist-Revised; TSDS = Trauma Symptoms of Discrimination Scale.

enrollment during the era of coronavirus disease (COVID-19)-related hospital visitor restrictions. Compared with family members who completed the study, those who consented but did not complete the study more commonly experienced the death of their loved ones. This may suggest that individuals who were experiencing the greatest stress were unable to assume the

additional burdens of research participation. Concerningly, this also may suggest that our results underestimate the true prevalence and impact of trauma in this population.

Conclusions

In this study of family members of mechanically ventilated patients, lifetime trauma was common and strongly

associated with negative family-clinician interpersonal outcomes. These results affirm the relevance of a life-course approach to trauma and suggest a need for a trauma-informed approach to ICU care. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

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