



# History of Racial Discrimination by Police Contributes to Worse Physical and Emotional Quality of Life in Black Americans After Traumatic Injury

Timothy J. Geier<sup>1</sup> · Sydney C. Timmer-Murillo<sup>1</sup> · Amber M. Brandolino<sup>2</sup> · Isela Piña<sup>1</sup> · Farah Harb<sup>3</sup> · Terri A. deRoos-Cassini<sup>1,2</sup>

Received: 9 March 2023 / Revised: 11 May 2023 / Accepted: 15 May 2023  
© W. Montague Cobb-NMA Health Institute 2023

## Abstract

**Background** Black Americans are more likely than their White counterparts to experience traumatic injury and worse functional outcomes. Unfair police treatment has been identified as one specific form of racial discrimination potentially driving these deleterious outcomes. The aim of the investigation was to better understand the relationship between experiences of discrimination by police and trauma-specific quality of life outcomes, including PTSD symptom severity, in Black Americans following traumatic injury.

**Method** Traumatically injured Black American adults ( $N=53$ ) presenting to a level 1 trauma center completed a measure of police and law enforcement discrimination at baseline, and quality of life and PTSD were assessed 6 months later.

**Results** Stepwise regressions results showed more frequent discrimination by police and law enforcement significantly predicted lower emotional and physical well-being 6 months after injury. Further, more frequent police discrimination resulted in more severe PTSD symptoms by 6 months after injury.

**Conclusions** Findings underscore that following an injury *not specifically related to discrimination by police*, patients' historical, negative police experiences contributed to worse physical and emotional recovery in the present. These findings, in unison with prior investigations, reveal the need to consider patients' history of negative police experiences as a social determinant of health in their recovery.

**Keywords** Discrimination · Police · Quality of life · Traumatic injury · Black Americans

## Introduction

In 2020, approximately 19 million adults in the United States (U.S.) were treated at an emergency department (ED) after experiencing a single incident traumatic event, with approximately 2.8 million of those individuals subsequently being hospitalized due to injuries sustained [1]. Despite traumatic

injury being a leading cause of death in the U.S., advancements in trauma systems have increased survival rates over time, shifting efforts from improving mortality rates to improving quality of life in the wake of survival [2–4]. Post-traumatic stress disorder (PTSD) has been identified as one of the most robust factors deleteriously impacting quality of life after injury, particularly when compared to traumatically injured individuals without PTSD [5]. Specifically, research suggests physical health, return to work, and recovery satisfaction are largely dependent on mental health following traumatic injury, even after adjusting for injury severity and physical recovery status [6].

Of concern, Black individuals in the U.S. (i.e., Black Americans) are more likely than their White counterparts to experience traumatic injury [7] as well as subsequent worse functional outcomes [8–10]. In line with this, they are not only at greater risk of developing PTSD in general, they also experience PTSD with greater severity and chronicity

✉ Timothy J. Geier  
tgeier@mcw.edu

<sup>1</sup> Department of Surgery, Division of Trauma and Acute Care Surgery, Medical College of Wisconsin, 8701 Watertown Plank Road, Milwaukee, WI 53226, USA

<sup>2</sup> Comprehensive Injury Center, Division of Data Surveillance and Informatics, Medical College of Wisconsin, Milwaukee, WI, USA

<sup>3</sup> Department of Psychology, University of Wisconsin—Milwaukee, Milwaukee, WI, USA

when compared to non-Hispanic White counterparts [11, 12]. Informing these elevated rates, Black Americans are at disproportionate risk of experiencing intentional, interpersonal injury, such as physical assault and gun violence [1], which in turn has been shown to pose a greater risk of PTSD development [13–16]. Deepening the understanding of other factors impacting inequitable recovery after injury, particularly in Black American communities experiencing greater disease burden, is crucial in reducing overall health burden and improving mental and physical quality of life for patients surviving a traumatic injury event.

One such factor identified in the literature is the experience of racism. Racism consists of interpersonal interactions, such as discriminatory experiences, and institutional/cultural dynamics which serve to malign and/or disregard individuals and groups based on physical attributes or ethnic group association [17]. Conceptually, racism, along with its direct and indirect effects, has generally been understood within the biopsychosocial model framework, where the experience of racism results in psychological and physiological stress reactions influenced by constitutional, sociodemographic, physiological, and behavioral factors, as well as coping reactions; these stress responses then influence various health outcomes [17–20]. This biopsychosocial model of health highlights that an individual's social context and lived experiences directly shape health and well-being. As such, it is critical to consider how one's history and experiences with racism might shape recovery following traumatic injury.

To this end, recent work underlines that experiencing racial discrimination, the behavioral manifestation of racism, is significantly predictive of greater PTSD symptom severity 6 months after traumatic injury in a Black American population, above and beyond acute stress [21]. Of note, the study examined the role general race-based discrimination plays in the development of PTSD; it did not examine whether more specific forms of racial discrimination, such as negative police and law enforcement experiences, differentially predict mental and physical health outcomes. To this point, differing forms of discrimination and the subsequent affective and coping sequelae have been linked with unique outcomes, including differing patterns of cardiovascular and autonomic activation [22].

Unfair police treatment has been identified as one specific form of racial discrimination driving deleterious outcomes. Critically, Black Americans are more likely to experience police brutality compared to White Americans, with whiteness being protective against police use of force [23, 24]. Empirical work has detailed the deleterious impact this type of discrimination has on various health-related outcomes, including mental health disorders, injury, and disease, as well as mortality [25–29]. In fact, researchers have suggested racial discrimination by law enforcement should be framed as a social determinant of health [30] and

a unique construct separate from other forms of violence and stress [31].

Relevant to the traumatic injury population, although generally not trained to critically injured individuals, law enforcement will often arrive at the scene of traumatic injury prior to emergency medical services [32]. Of concern, the routine presence of law enforcement personnel in healthcare settings can be fear-inducing and drive mistrust beyond police to medical professionals [33–35]. In line with this generalization of mistrust, patients are more likely to intentionally minimize symptoms and withhold information from medical providers out of concern information will be shared with law enforcement [33]. Further, traumatic injury can contribute to increase risk of future policing and incarceration, all of which have been shown to exacerbate racial health disparities [36].

Poor quality of life after traumatic injury inequitably affects Black communities already marginalized by systemic inequities, places undue burden on the healthcare system, and subsequently comes at the cost to other systems (e.g., education, social support services) [37]. Altogether, developing the understanding of how discrimination by police specifically influences quality of life after traumatic injury has the potential to inform more effective interventions. The aim of the current investigation was to better understand the relationship between experiences of discrimination by police and trauma-specific quality of life outcomes, including PTSD symptom severity, in Black Americans following traumatic injury.

## Method

### Participants and Procedure

The sample was from a prospective study aimed at identifying posttraumatic risk factors of PTSD development using biospecimens, genetics, and self-report measures (study name: Study on Trauma and Resilience (STAR) 2.0). Participants were asked to complete three study visits: in hospital (baseline), 3 months, and 6 months postinjury. Enrolled participants were treated in the ED and either discharged or admitted to the Level I Trauma hospital for a single-incident traumatic injury. Inclusion criteria were the following: (1) 18 years of age or older; (2) Glasgow Coma Scale > 13 on arrival; (3) did not meet criteria for moderate to severe traumatic brain injury; (4) injury was not self-inflicted; (5) were not on police hold or discharging to jail; and (6) ability to communicate meaningfully in English or Spanish. Recruitment, consent, and data protection procedures were approved by the Institutional Review Board. Notably, if a patient qualified for the study, a trained psychology graduate or undergraduate research associate approached them,

detailed the purpose and process of the study (e.g., “we are interested in how past stressful or traumatic experiences inform recovery after traumatic injury”), and conducted the informed consent process. If the patient agreed to participate, they were subsequently enrolled during admission; follow-up data were collected via telephone or in person in an ambulatory hospital clinic.

Data were obtained from September 2017 through March 2021. A total of 8167 potential participants were screened consecutively via a daily ED and trauma census and based on the inclusion criteria, 221 were eligible for participation. Of those, a total of 187 participants consented and completed the baseline protocol during initial ED/hospital encounter.

Relevant to the current study, of the 187 total participants, there were 72 Black participants who completed self-report measures at baseline. Among these individuals, retention between baseline and 6-month follow-up was 73.61%, resulting in a final analytic sample of 53. Significant differences between completers ( $n = 53$ ) and those lost to follow-up ( $n = 19$ ) were evaluated across the following baseline variables: age, gender, education, history of psychiatric diagnosis (yes versus no), mechanism of injury (MOI; assaultive versus non-assaultive), injury severity score (ISS), lifetime stressful life events, and acute stress reactions (PCL-5, PTSD Checklist for DSM-5). Completers and those lost to follow-up did not significantly differ across any of these variables ( $p > 0.05$ ).

Baseline demographic characteristics for the final sample ( $N = 53$ ) include the following: mean age of 35.42 years ( $SD = 14.34$ ); 62.3% male; 49.1% employed either part-time or full-time. Regarding education, 41.5% of the sample had at least some college, with another 45.3% of the sample obtaining a high school degree. Most participants did not endorse a history of formal psychiatric diagnosis ( $n = 38$ , 71.7%).

In terms of injury characteristics at baseline, most injuries were a result of non-assaultive trauma (62.3%), whereas the remaining 37.7% were due to assaultive trauma (e.g., gunshot wound, stabbing). Regarding injury severity, mean ISS was 15.34 ( $SD = 10.68$ ). The mean of baseline PCL-5 scores was 23.68 ( $SD = 20.37$ ).

## Measures

**Demographic and Injury Information** At baseline, participants provided demographic information, including age, gender, race/ethnicity, education level, and employment status, as well as whether they had ever received a formal psychiatric diagnosis. ISS as well as MOI (i.e., assaultive versus non-assaultive) were documented from the medical chart and trauma registry respectively.

**Lifetime Trauma Exposure at Baseline** The Life Events Checklist for DSM-5 is a self-report measure assessing exposure to potentially traumatic events, such as transportation accidents, sexual assault, and life-threatening illness [38]. Participants specified if the event happened to them, they witnessed the event, and/or they learned about the event happening someone they knew. Per scoring recommendations [39], responses indicating participants directly experienced the event, witnessed it, or learned about it happening were merged to generate a total weighted life events score (maximum score = 102). Specifically, events experienced directly were weighted by a factor of 3, items witnessed were weighted by a factor of 2, and events learned about were weighted by a factor of 1 [39]; higher scores indicate a greater exposure to potentially traumatic events. Cronbach's alpha was 0.86 in the present analytic sample.

**Police and Law Enforcement Experiences at Baseline** The Police and Law Enforcement (PLE) scale is a self-report measure of Black individual's experiences of discrimination by police and law enforcement [40]. The scale contains 5 items on a 4-point Likert scale ranging from 1 (“never”) to 4 (“often/frequently”). Items include, “Has a police officer been physically abusive to you due to your race?” and “Has a police officer accused you of selling drugs due to your race?” Higher scores indicate more frequent deleterious experiences with police officers. The PLE scores have demonstrated good reliability among Black populations [40]. Internal consistency reliability of the present study was good for the overall sample (Cronbach's Standardized  $\alpha = 0.85$ ); more specifically, it was good for men (Cronbach's  $\alpha = 0.87$ ) and acceptable for women (Cronbach's  $\alpha = 0.73$ ).

**Acute Stress Reactions at Baseline** The PTSD Checklist for *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (PCL-5) was used to assess acute PTSD symptoms at baseline [41]. The PCL-5 is a 20-item self-report measure assessing the extent to which a participant is distressed by each of the DSM-5 PTSD symptoms. Each symptom is rated on a 0–4 scale, from 0 (“not at all”) to 4 (“extremely”). A total symptom severity score (range: 0–80) is obtained by summing scores of all items. The PCL-5 has been found to exhibit strong reliability and validity in psychometric evaluation [41]. Cronbach's alpha was 0.93 in the present analytic sample. The index traumatic event for assessment was the traumatic injury for which participants presented to the hospital.

**Quality of Life at 6 Months** The Revised Trauma Quality of Life (RT-QoL) measure is a 3-factor, 18-item instrument developed for the assessment of quality of life specific to the trauma population [42]. Domains include emotional well-being (e.g., my mood has become worse since the

injury), functional engagement (e.g., “I need help walking up stairs”), and physical well-being and recovery (e.g., “I have pain on a daily basis”); domain scores were generated by averaging participant’s responses across the items of each domain, with higher values reflecting better health status. The RT-QoL has been shown to preserve the strong specificity, validity, and psychometric properties of the original instrument [42].

**PTSD Symptom Severity at 6 Months** The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5), a 30-item structured clinical interview mirroring the PTSD factor structure outlined by DSM-5, was administered approximately 6 months after injury date [43]. It is considered the gold standard for assessing PTSD symptoms, with questions identifying the onset and duration of symptoms as well as subjective distress and impact of symptoms on functioning. Overall, psychometric investigations suggest the CAPS-5 is a psychometrically sound measure of DSM-5 PTSD diagnosis and severity of symptoms [43]. The CAPS-5 was administered and scored by trained graduate and postdoctoral level mental health professionals. As with the PCL-5, the index traumatic event for assessment was the traumatic injury for which participants presented to the hospital.

## Data Analytic Plan

Descriptive statistics using proportions and means along with standard deviations for the demographic and injury characteristics of the sample were computed. Means, standard deviations, and ranges were also presented for continuous variables. To test bivariate associations between continuous study variables (i.e., mean-centered) and categorical factors, Pearson’s and point biserial correlations were calculated, respectively (Table 2).

The relationship between PLE at baseline and quality of life (i.e., RT-QoL factors and CAPS-5) 6 months post-injury was examined using hierarchical linear regression. In step 1, covariates known to be predictors of maladjustment were entered in the model, including age, gender, mechanism of injury (i.e., assaultive versus non-assaultive), history of psychiatric diagnosis (i.e., yes versus no), and lifetime exposure to stressful events [15, 21]. Of note, baseline acute stress symptoms (i.e., PCL-5) were included as a covariate in the models predicting CAPS-5 at 6 months. The second step included the PLE to determine the added predictability of each of the subscales of quality of life. All analyses were performed using SAS™ Studio software (3.8, Enterprise Edition) and SPSS.

**Table 1** Descriptive statistics of categorical study variables ( $N=53$ )

	$N$ (%)
Gender	
Female	20 (37.7)
Male	33 (62.3)
Education	
Less than high school	7 (13.2)
High school diploma	24 (45.3)
Some college	17 (32.1)
College degree or higher	5 (9.4)
Employment	
Unemployed	27 (50.9)
Employed	26 (49.1)
Previous psychiatric diagnosis	
Yes	15 (28.3)
No	38 (71.7)
Mechanism of injury	
Assaultive	20 (37.7)
Non-assaultive	33 (62.3)

**Table 2** Descriptive statistics of dimensional study variables ( $N=53$ )

Measure	$M$	SD	Range
Age	35.42	14.34	18.4–66.9
Injury severity score	15.34	10.68	2–43
LEC (weighted score)	21.42	12.52	2–57
PCL-5	23.68	20.37	0–72
PLE	10.43	7.31	6–35
Accused of selling drugs	1.34	1.07	1–6
Pulled over for no reason	1.83	1.53	1–6
Verbally abusive	1.81	1.49	1–6
Physically abusive	1.36	0.98	1–6
Treated unfairly	1.96	1.81	1–6
CAPS-5 severity	18.85	16.67	0–54
RT-QoL—emotional well-being	2.47	1.06	0–4
RT-QoL—functional engagement	3.40	0.68	1.7–4
RT-QoL—physical well-being and recovery	2.03	0.75	1–4

LEC Lifetime Events Checklist, PCL-5 PTSD Checklist for DSM-5, PLE Police and Law Enforcement Scale, CAPS-5 Clinician-Administered PTSD Scale for DSM-5, RT-QoL Revised Trauma Quality of Life

## Results

Descriptive statistics for key study variables are displayed in Tables 1 and 2. Of note, approximately 51% of the sample ( $n=27$ ) indicated at least one lifetime experience of discrimination by police. The bivariate correlations, detailed in Table 3, revealed the PLE was significantly,

**Table 3** Spearman’s rank correlation coefficients for key study variables ( $N=53$ )

	1	2	3	4	5	6	7	8	9	10	11
1. Age	–										
2. Male gender	–0.04	–									
3. Psychiatric history	0.12	0.29*	–								
4. Interpersonal MOI	–0.22	–0.20	–0.14	–							
5. ISS	–0.12	0.16	–0.15	0.12	–						
6. LEC	–0.02	–0.11	0.03	–0.05	0.23	–					
7. CAPS-5	–0.14	0.25	0.29*	0.27*	0.08	0.1	–				
8. RT-QoL emotional	0.13	–0.25	–0.36**	–0.35**	–0.07	–0.2	–0.81**	–			
9. RT-QoL functional	–0.01	–0.23	–0.11	–0.26	–0.34*	–0.08	–0.33*	0.46**	–		
10. RT-QoL physical	–0.32*	–0.04	–0.29*	–0.02	–0.01	–0.21	–0.39**	0.51**	0.30*	–	
11. PLE	–0.27	–0.28*	–0.22	0.016	0.24	0.27*	0.31*	–0.23	–0.20	–0.19	
12. PCL-5	–0.33*	0.18	0.19	0.19	0.08	0.09	0.63**	–0.68**	–0.30*	–0.41**	0.25

*MOI* mechanism of injury, *ISS* Injury Severity Score, *LEC* Lifetime Events Checklist, *CAPS-5* Clinician-Administered PTSD Scale for DSM-5, *RT-QoL* Revised Trauma Quality of Life, *PLE* Police and Law Enforcement Scale, *PCL-5* PTSD Checklist for DSM-5

\* $p < 0.05$ ; \*\* $p < 0.01$

positively associated with male gender, the LEC, and the CAPS-5. The PLE was not significantly correlated with the three RT-QoL subscales.

Looking first at emotional well-being, results demonstrated that step 1 of the was significant ( $F(6,52) = 5.33, p < 0.001$ ) and the regression predicted 41.0% of variance in emotional well-being. Step 2, including the PLE, was also significant ( $F(7,52) = 6.025, p < 0.001, \Delta F(1,45) = 6.44, p = 0.015, R^2 \text{ change} = 0.074$ ), suggesting that PLE subscales predicted 7.4% additive variance of emotional well-being (see Table 4). Regarding physical well-being, results demonstrated that step 1 of the was not significant ( $F(6,52) = 2.23, p = 0.057$ ). However, with the addition of the PLE in step 2, the regression was significant ( $F(7,52) = 2.91, p = 0.014, \Delta F(1,45) = 5.62, p = 0.022, R^2 = 0.31, R^2 \text{ change} = 0.086$ ), suggesting that the total regression predicted 31% of the variance of physical well-being and the PLE predicted 8.6% of variance (see Table 5). Examining functional engagement, results demonstrated that step 1 was significant ( $F(6,52) = 2.57, p = 0.032$ ) and the regression predicted 25.1% of variance in functional engagement. Step 2, including the PLE, was also significant ( $F(7,52) = 2.72, p = 0.019$ ). However, the change statistics were not significant,  $\Delta F(1,45) = 3.00, p = 0.09, R^2 \text{ change} = 0.047$ ) and the PLE was not a significant coefficient in the model.

Lastly, the CAPS-5 was examined to determine predicted variance of PTSD symptoms by the PLE. Results demonstrated that step 1 of the was significant ( $F(7,52) = 6.23, p < 0.001$ ), and the regression predicted 49.2% of variance in PTSD symptoms. Step 2, including the PLE, was also significant ( $F(8,52) = 7.18, p < 0.001, \Delta F(1,44) = 7.49, p = 0.009, R^2 \text{ change} = 0.074$ ), suggesting that PLE subscales predicted 7.4% additive variance of PTSD symptoms (see Table 6).

**Table 4** Stepwise regression RT-QoL emotional well-being ( $N=53$ )

Predictor	<i>b</i> (SE)	$\beta$	<i>p</i>	95% C.I.
Step 1: $R^2 = .48$ ( $F(6, 52) = 5.33, p < .001$ )				
Constant	3.52 (.47)	–	<.001	3.59, 4.96
Age	–.005 (.006)	–.11	.41	–.02, 0.01
Gender	–.32 (.20)	–.23	.11	–.73, 0.08
Injury Severity Score	–.02 (.01)	–.28	.051	–.04, 0.00
LEC	–.003 (.01)	–.06	.65	–.02, .01
Interpersonal MOI	–.45 (.19)	–.32	.02	–0.83, –.06
Psychiatric history	–.17 (.21)	–.11	.42	–.59, .25
Step 2: $\Delta R^2 = .07$ ( $\Delta F(1,45) = 6.44, p = .015$ )				
Constant	4.06 (.49)	–	<.001	3.07, 5.06
Age	–.001 (.01)	–.01	.92	–0.02, 0.02
Gender	–.79 (.27)	–.37	.005	–1.33, –.24
Injury Severity Score	.01 (.01)	.11	.37	–.01, .04
LEC	–.02 (.01)	–.19	.10	–.04, .003
Interpersonal MOI	–.98 (.25)	–.46	<.001	–1.48, –.49
Psychiatric history	–.85 (.27)	–.36	.003	–1.39, –.30
PLE	–.05 (.02)	–.32	.015	–.08, –.01

*RT-QoL* Revised Trauma Quality of Life, *LEC* Lifetime Events Checklist, *MOI* mechanism of injury, *PLE* Police and Law Enforcement Scale

## Discussion

The purpose of this study was to evaluate how experiences of discrimination by law enforcement impacted outcomes following injury for Black Americans. Of note, more than 50% of the current study’s sample reported experiencing

**Table 5** Stepwise regression analyses of PLE predicting RT-QoL physical well-being ( $N=53$ )

Predictor	$b$ (SE)	$\beta$	$p$	95% C.I.
Step 1: $R^2 = .225$ ( $F(6, 52) = 2.23, p = 0.057$ )				
Constant	3.147 (.38)	–	<.001	2.378, 3.917
Age	–.017 (.007)	–.323	.021	–.031, –.003
Gender	–.047 (.24)	–.031	.835	–.498, .404
Injury Severity Score	–.001 (.01)	–.018	.903	–.021, .019
LEC	–.013 (.008)	–.217	.121	–.03, .004
Interpersonal MOI	–.214 (.21)	–.139	.322	–.643, .216
Psychiatric history	–.424 (.23)	–.256	.075	–.893, .045
Step 2: $\Delta R^2 = .086$ ( $\Delta F(1, 45) = 5.62, p = .022$ )				
Constant	3.565 (.405)	–	<.001	2.749, 4.380
Age	–.021 (.007)	–.402	.004	–0.35, –.007
Gender	–1.9 (.222)	–.123	.398	–636, .257
Injury Severity Score	.003 (.01)	.048	.730	–.016, .023
LEC	–.009 (.008)	–.15	.267	–.025, .007
Interpersonal MOI	–.20 (.203)	–.13	.331	–.609, .210
Psychiatric history	–.47 (.223)	–.284	.041	–.919, –.021
PLE	–.03 (.015)	–.341	.022	.065, –.005

*RT-QoL* Revised Trauma Quality of Life, *LEC* Lifetime Events Checklist, *MOI* mechanism of injury, *PLE* Police and Law Enforcement Scale

discrimination in police encounters, paralleling the high prevalence rates of police brutality among Black Americans in other research populations [44, 45]. Although racism has been ever-present in the U.S., recent civil unrest related to police and law enforcement discrimination and brutality toward Black Americans underscores the need to better understand the impact these experiences have on individuals and communities. Paralleling historical appeals to end racial discrimination by police and law enforcement agencies [46], civil rights leaders have referenced the deleterious effects of race-based discrimination on Black Americans. A robust body of social science literature reinforces these calls, yet there is a paucity of investigations examining the way in which police-perpetrated discrimination affects the psychological and physical outcomes for Black Americans across different domains of life, such as in recovery from traumatic injury. With this in mind, the aim of the current investigation explored how experiences of discrimination by police and law enforcement influence recovery in Black Americans following traumatic injury, specifically as it relates to physical and emotional quality of life.

**Table 6** Stepwise regression analyses of PLE predicting CAPS-5 ( $N=53$ )

Predictor	$b$ (SE)	$\beta$	$p$	95% C.I.
Step 1: $R^2 = .48$ ( $F(6, 46) = 5.33, p < .001$ )				
Constant	–4.27 (7.42)	–	.56	–19.22, 10.68
Age	.096 (.13)	.08	.48	–.17, .368
Gender	5.94 (4.12)	.17	.15	–2.35, 14.24
Injury Severity Score	–.01 (.018)	–.007	.95	–.37, .35
LEC	.10 (.15)	–.08	.47	–.19, .41
Interpersonal MOI	8.5 (3.9)	–.25	.03	.64, 16.55
Psychiatric history	5.9 (4.3)	.16	.17	–2.74, 14.66
PCL-5	.44 (.10)	.54	<.001	.24, .64
Step 2: $\Delta R^2 = .07$ ( $\Delta F(1, 44) = 7.49, p < .001$ )				
Constant	–11.27 (7.39)	–	1.35	–26.18, 3.63
Age	.15 (.12)	.01	.23	–.104, .41
Gender	9.47 (4.06)	.27	.24	1.28, 17.6
Injury Severity Score	–.01 (.01)	–.07	.53	–.45, .24
LEC	.03 (.14)	.02	.80	–.25, .32
Interpersonal MOI	8.8 (3.69)	.26	.02	1.42, 16.3
Psychiatric history	7.59 (4.08)	.20	.07	–.63, 15.8
PCL-5	.37 (.10)	.45	<.001	.18, .56
PLE	.74 (.27)	.32	.009	.19, 1.29

*CAPS-5* Clinician-Administered PTSD Scale for DSM-5, *LEC* Lifetime Events Checklist, *MOI* Mechanism of Injury, *PCL-5* PTSD Checklist for DSM-5, *PLE* Police and Law Enforcement Scale

It was hypothesized that experiencing more frequent discrimination by police and law enforcement prior to injury would predict poorer quality of life and higher PTSD symptom severity following injury, compared to patients experiencing fewer negative police and law enforcement interactions prior to injury. Results demonstrated support for this hypothesis. Specifically, more frequent discrimination by police and law enforcement significantly predicted lower emotional and physical well-being 6 months after injury. Further, more frequent police discrimination resulted in more severe PTSD symptoms by 6 months after injury. This builds on prior research that found racial discrimination experiences, measured generally, significantly predict more severe PTSD symptom presentations 6 months after injury in Black Americans, above and beyond acute stress [21].

In the current study, following an injury *not specifically related to discrimination by police*, patients' historical, negative police experiences deleteriously influenced their physical and emotional recovery in the present. Indeed, patients' self-reported physical quality of life was inversely related to their discrimination experiences with police, where

those with more frequent past negative police interactions endorsed worse physical well-being 6 months after traumatic injury (e.g., “I am able to exercise like I used to,” “I am able to continue my normal leisure activities,” “I currently have physical limitations”). This parallels a robust oeuvre highlighting how prior trauma or adverse experiences can detrimentally impact subsequent health and wellness [47]. Further, prior discrimination by police predicts worse emotional well-being (e.g., “I am angry that I got injured,” “I have to rely on others...because of my current financial limitations”) and heightened PTSD symptoms. Traumatic injury already increases risk for development of PTSD given direct exposure to trauma and ongoing stress of physical injury. Beyond this already increased risk and regardless of MOI, more frequent past discrimination by police resulted in more severe PTSD symptoms related to their injury.

Although the current investigation did not directly examine the causal pathways of this relationship between police discrimination and poor quality of life outcomes, as these insidiously harmful experiences are signals of racism [48], mechanistic factors linking racism to morbidity can likely also be mapped onto the relationship between police brutality and morbidity. One factor cited in the literature that may increase morbidity is the adverse physiological responses following discrimination experiences, where general race-based discrimination can lead to heightened vigilance and subsequent poor sleep, increased hypertension, and psychological distress [49–52]. More specific to police interactions, heightened vigilance has been found to, at least in part, mediate the relationship between police brutality and mental health outcomes in Black Americans [45]. Further, fear and mistrust because of police brutality may prevent marginalized populations from engaging in help seeking behaviors, resulting in systematic disempowerment and feelings of dehumanization and isolation [53, 54].

Systemic discrimination is unfortunately present across numerous mutually reinforcing societal structures, including law enforcement, housing, education, and healthcare settings. In line with this, trauma centers’ care for racially marginalized patients is disparate, with Black Americans having higher rates of mortality and functional deficits after trauma relative to their White counterparts [55]. This extends into patients’ subjective experience as well, with Black American injury survivors reporting greater unmet needs, barriers to follow up care, and mistrust in their providers [56]. Beyond the mistrust Black Americans have directly with the healthcare system in the U.S. due to well-documented inequities [57], there is evidence to suggest learned mistrust of one system of power may generalize to mistrust in other systems of power. For example, race-based discrimination at work or school has been connected to expectations of discrimination in healthcare settings [58]. In fact, individuals experiencing

discriminatory interactions with police are more likely to mistrust healthcare systems [59].

Of additional concern within healthcare settings, hospitals routinely have law enforcement officers present, particularly in injury situations with ongoing investigations (e.g., firearm violence). Not only have healthcare professionals expressed significant concern and uncertainty related to police role in hospital settings where patients are receiving care [60], Black American patients have described police presence during hospitalization as dehumanizing and diminishing their trust in healthcare providers due to suspected collusion between the two systems [33, 56]. In fact, this mistrust can yield a reduced engagement in treatment recommendations throughout the course of hospitalization [33, 61]. Adding to this perception, Black American patients are more likely than their White counterparts to experience security emergency responses and physical restraints in non-psychiatric inpatient settings as well as “security standby requests” when being visited by support systems [62, 63]. Further, security guards or armed officers involved in a patient’s hospitalization are not often monitored by hospital staff [28, 57, 60]. For patients with previous negative interactions with law enforcement, this may be particularly re-traumatizing, which is a direct threat to one of the guiding assumptions of trauma-informed care (i.e., resisting re-traumatization [64]) and can exacerbate the fear response associated with the injury event.

### Limitations and Future Directions

These findings are not without limitations. First, these analyses focused specifically on a limited sample of Black Americans from a larger study on trauma and resilience that was relatively homogenous related to MOI, with most participants having experienced a motor vehicle or motorcycle crash. Although individuals who experience PTSD symptoms because of a traumatic injury are an understudied population despite the prevalence of injury, the generalizability of these results from this distinct sample may be limited. Further limiting generalizability, sampling bias could have been introduced in the exclusion of the unknown fraction of Black individuals that chose not to participate and provide data. Future investigations would benefit from exploring heterogeneous populations across MOI and other marginalized races/ethnicities; however, as the PLE was validated only among Black individuals, use of this measure is psychometrically limited in examining other racial/ethnic populations. Additionally, past police discrimination experiences and exposure to lifetime traumatic events were measured retrospectively, a methodology associated with response bias, but a necessary study design due to the unpredictability of when traumatic injury will occur and to whom [65].

Investigations of this nature have the potential to aid providers and researchers in detecting factors that influence poor quality of life and thereby identify specific targets for effective, precise interventions, and follow-up services that are trauma informed by nature. These findings, in unison with prior investigations, reveal the need to consider patients' history of negative police experiences as a social determinant of health in their recovery.

## Conclusion

Although research has highlighted the relationships between quality of life and traumatic injury survivors [5] as well as between quality of life and discrimination by police experiences [17–20], this was the first investigation exploring these constructs together. To our knowledge, this is also the first work examining the impact discrimination by police officers has on racial health disparities for Black Americans, suggesting that prior discriminatory experiences detrimentally impact physical and mental health recovery. The implications of these results are further magnified by the recent civil unrest in the wake of widely publicized murders of unarmed Black Americans at the hands of police and the disproportionate effect of the COVID-19 pandemic on Black American communities, including an increase in injury [66, 67]. Recovery following traumatic is inherently biopsychosocial with patients' past experience, current contexts, and communities shaping recovery. As such, it is fundamental that healthcare systems consider the ways in which past discrimination by police might unduly influence patient experience both in the hospital and post-discharge following injury. Policy and practice changes are necessary to improve care and reduce re-traumatization due to law enforcement presence in the hospital and the disparity in power between patients and providers.

**Author Contribution** All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Timothy Geier, Sydney Timmer-Murillo, Isela Piña, and Farah Harb. The first draft of the manuscript was written by Timothy Geier, Sydney Timmer-Murillo, Amber Brandolino, Isela Piña, and Farah Harb. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

**Funding** The work within this manuscript was supported by the NIMH (grant no. R01-M1H106574 (principal investigator, Larson)), NIH (Grant No. R56 MH116656-01A1 (principal investigator, deRoon-Cassini)), and a Medical College of Wisconsin CTSI Pilot Award (principal investigator, deRoon-Cassini).

**Data Availability** The data that support the findings of this study are available from the corresponding author, TG, upon reasonable request.

## Declarations

**Competing Interests** The authors declare no competing interests.

## References

- Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2020). Available from URL: [www.cdc.gov/injury/wisqars](http://www.cdc.gov/injury/wisqars). Accessed 8 Jul 2022.
- Nathens AB, Brunet FP, Maier RV. Development of trauma systems and effect on outcomes after injury. *The Lancet*. 2004;363(9423):1794–801.
- Glance LG, et al. Outcomes of adult trauma patients admitted to trauma centers in Pennsylvania, 2000–2009. *Arch Surg*. 2012;147(8):732–7.
- DiMaggio C, et al. Traumatic injury in the United States: inpatient epidemiology 2000–2011. *Injury*. 2016;47(7):1393–403.
- Kiely JM, et al. Predicting quality of life six months after traumatic injury. *J Trauma Acute Care Surg*. 2006;61(4):791–8.
- Michaels AJ, et al. Outcome from injury: general health, work status, and satisfaction 12 months after trauma. *J Trauma Acute Care Surg*. 2000;48(5):841–50.
- Cubbin C, LeClere FB, Smith GS. Socioeconomic status and injury mortality: individual and neighbourhood determinants. *J Epidemiol Community Health*. 2000;54(7):517–24.
- Arango-Lasprilla JC, et al. Traumatic brain injury and functional outcomes: does minority status matter? *Brain Inj*. 2007;21(7):701–8.
- Staudenmayer KL, et al. Ethnic disparities in long-term functional outcomes after traumatic brain injury. *J Trauma Acute Care Surg*. 2007;63(6):1364–9.
- Glance LG, et al. Trends in racial disparities for injured patients admitted to trauma centers. *Health Serv Res*. 2013;48(5):1684–703.
- Alegria M, et al. Prevalence, risk, and correlates of posttraumatic stress disorder across ethnic and racial minority groups in the US. *Med Care*. 2013;51(12):1114.
- Sibrava NJ, et al. Posttraumatic stress disorder in African American and Latinx adults: Clinical course and the role of racial and ethnic discrimination. *Am Psychol*. 2019;74(1):101.
- Alarcon LH, et al. Predictors of acute posttraumatic stress disorder symptoms following civilian trauma: highest incidence and severity of symptoms after assault. *J Trauma Acute Care Surg*. 2012;72(3):629–37.
- Chiu KB, deRoon-Cassini TA, Brasel KJ. Factors identifying risk for psychological distress in the civilian trauma population. *Acad Emerg Med*. 2011;18(11):1156–60.
- Ozer EJ, et al. Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychol Bull*. 2003;129(1):52.
- Zatzick DF, et al. A nationwide US study of post-traumatic stress after hospitalization for physical injury. *Psychol Med*. 2007;37(10):1469–80.
- Clark R, et al. Racism as a stressor for African Americans: a biopsychosocial model. *Am Psychol*. 1999;54(10):805.
- Paradies Y. A systematic review of empirical research on self-reported racism and health. *Int J Epidemiol*. 2006;35(4):888–901.
- Paradies Y, et al. Racism as a determinant of health: a systematic review and meta-analysis. *PLoS One*. 2015;10(9):e0138511.
- Priest N, et al. A systematic review of studies examining the relationship between reported racism and health and wellbeing for children and young people. *Soc Sci Med*. 2013;95:115–27.
- Bird CM, et al. Racial discrimination is associated with acute posttraumatic stress symptoms and predicts future posttraumatic stress disorder symptom severity in trauma-exposed Black adults in the United States. *J Trauma Stress*. 2021;34(5):995–1004.
- Saab P, et al. Ethnic differences in blood pressure regulation. In: McCabe P, et al. *Stress, coping, and cardiovascular disease*. Lawrence Erlbaum Associates Publishers; 2000. pp. 145–180.
- Kahn KB, et al. Protecting whiteness: White phenotypic racial stereotypicality reduces police use of force. *Soc Psychol Personal Sci*. 2016;7(5):403–11.



24. Swaine J, et al. Young black men killed by US police at highest rate in year of 1,134 deaths. *The Guardian*. 2015;31.
25. DeVlyder JE, et al. Association of exposure to police violence with prevalence of mental health symptoms among urban residents in the United States. *JAMA Netw Open*. 2018;1(7):e184945–e184945.
26. Jackson FM, et al. Anticipated negative police-youth encounters and depressive symptoms among pregnant African American women: a brief report. *J Urban Health*. 2017;94:259–65.
27. Sewell AA. The illness associations of police violence: differential relationships by ethnoracial composition. In: *Sociological Forum*. Wiley Online Library; 2017.
28. Feldman JM, et al. Temporal trends and racial/ethnic inequalities for legal intervention injuries treated in emergency departments: US men and women age 15–34, 2001–2014. *J Urban Health*. 2016;93:797–807.
29. Bui AL, Coates MM, Matthay EC. Years of life lost due to encounters with law enforcement in the USA, 2015–2016. *J Epidemiol Commun Health*. 2018;72(8):715–8.
30. Alang S, et al. Police brutality and black health: setting the agenda for public health scholars. *Am J Public Health*. 2017;107(5):662–5.
31. DeVlyder J, Fedina L, Link B. Impact of police violence on mental health: a theoretical framework. *Am J Public Health*. 2020;110(11):1704–10.
32. Alonso-Serra HM, et al. Law enforcement agencies and out-of-hospital emergency care. *Ann Emerg Med*. 1997;29(4):497–503.
33. Liebschutz J, et al. A chasm between injury and care: experiences of black male victims of violence. *J Trauma*. 2010;69(6):1372.
34. Jacoby SF, et al. A safe haven for the injured? Urban trauma care at the intersection of healthcare, law enforcement, and race. *Soc Sci Med*. 2018;199:115–22.
35. Tahouni MR, Liscord E, Mowafi H. Managing law enforcement presence in the emergency department: highlighting the need for new policy recommendations. *J Emerg Med*. 2015;49(4):523–9.
36. Bailey JA, et al. Compounding trauma: the intersections of racism, law enforcement, and injury. *Current trauma reports*. 2022;8(3):105–12.
37. Turner A. *The business case for racial equity: a strategy for growth*. Altarum Institute; 2018.
38. Weathers F et al. *The Life Events Checklist for DSM-5 (LEC-5)*. Instrument available from the National Center for PTSD at [www.ptsd.va.gov](http://www.ptsd.va.gov) (2013).
39. Weis CN, et al. Scoring the Life Events Checklist: comparison of three scoring methods. *Psychol Trauma Theory Res Pract Policy*. 2022;14(4):714.
40. English D, et al. Measuring Black men's police-based discrimination experiences: development and validation of the Police and Law Enforcement (PLE) Scale. *Cultur Divers Ethnic Minor Psychol*. 2017;23(2):185.
41. Blevins CA, et al. The posttraumatic stress disorder checklist for DSM-5 (PCL-5): development and initial psychometric evaluation. *J Trauma Stress*. 2015;28(6):489–98.
42. Herrera-Escobar JP, et al. Development and validation of a revised trauma-specific quality of life instrument. *J Trauma Acute Care Surg*. 2020;88(4):501–7.
43. Weathers FW, et al. The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5): development and initial psychometric evaluation in military veterans. *Psychol Assess*. 2018;30(3):383.
44. Edwards F, Esposito MH, Lee H. Risk of police-involved death by race/ethnicity and place, United States, 2012–2018. *Am J Public Health*. 2018;108(9):1241–8.
45. Alang S, et al. Police brutality, heightened vigilance, and the mental health of Black adults. *Psychol Violence*. 2022;12(4):211.
46. Diallo K, Wolff C. *My heart will cross this ocean: my story, my son, Amadou*. One World; 2004.
47. Bellis MA, et al. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *The Lancet Public Health*. 2019;4(10):e517–28.
48. Boyd RW. Police violence and the built harm of structural racism. *Lancet*. 2018;392(10144):258–9.
49. Hicken MT, et al. “Every shut eye, ain’t sleep”: the role of racism-related vigilance in racial/ethnic disparities in sleep difficulty. *Race Soc Probl*. 2013;5:100–12.
50. Himmelstein MS, et al. Vigilance in the discrimination-stress model for Black Americans. *Psychol Health*. 2015;30(3):253–67.
51. LaVeist TA, et al. The relationships among vigilant coping style, race, and depression. *J Soc Issues*. 2014;70(2):241–55.
52. Taylor S, Wald J. Expectations and attributions in social anxiety disorder: diagnostic distinctions and relationship to general anxiety and depression. *Cogn Behav Ther*. 2003;32(4):166–78.
53. Bryant-Davis T, et al. The trauma lens of police violence against racial and ethnic minorities. *J Soc Issues*. 2017;73(4):852–71.
54. Grills CN, Aird EG, Rowe D. Breathe, baby, breathe: clearing the way for the emotional emancipation of Black people. *Cultural Studies? Crit Methodol*. 2016;16(3):333–43.
55. Haider AH, et al. Disparities in trauma care and outcomes in the United States: a systematic review and meta-analysis. *J Trauma Acute Care Surg*. 2013;74(5):1195.
56. Patton D, et al. Post-discharge needs of victims of gun violence in Chicago: a qualitative study. *J Interpers Violence*. 2019;34(1):135–55.
57. Laurencin CT, Walker JM. A pandemic on a pandemic: racism and COVID-19 in Blacks. *Cell Syst*. 2020;11(1):9–10.
58. Alang SM. Mental health care among Blacks in America: confronting racism and constructing solutions. *Health Serv Res*. 2019;54(2):346–55.
59. Alang S, McAlpine DD, Hardeman R. Police brutality and mistrust in medical institutions. *J Racial Ethn Health Disparities*. 2020;7:760–8.
60. Schroeder ME, et al. Addressing the educational gap in the role of law enforcement personnel in the resuscitation bay. *Surgery*. 2023;173(3):804–11.
61. Gallen K et al. Health effects of policing in hospitals: a narrative review. *J Racial Ethn Health Disparities*. 2022;1–13.
62. Valtis YK, et al. Race and ethnicity and the utilization of security responses in a hospital setting. *J Gen Intern Med*. 2023;38(1):30–5.
63. Green CR, McCullough WR, Hawley JD. Visiting Black patients: Racial disparities in security standby requests. *J Natl Med Assoc*. 2018;110(1):37–43.
64. SAMHSA. SAMHSA's concept of trauma and guidance for a trauma-informed approach. HHS Publication No. (SMA) 14–4884. 2014. Rockville, MD.
65. Lalande KM, Bonanno GA. Retrospective memory bias for the frequency of potentially traumatic events: a prospective study. *Psychol Trauma Theory Res Pract Policy*. 2011;3(2):165.
66. Dreyer, Benard P et al. The death of george floyd: bending the arc of history toward justice for generations of children. *Pediatrics*. 2020;146(3):e2020009639. <https://doi.org/10.1542/peds.2020-009639>
67. Leitch S, et al. Black Lives Matter in health promotion: moving from unspoken to outspoken. *Health Promot Int*. 2021;36(4):1160–9.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.