



Caring for the Elderly in Trauma (Racism, Equity, and Disparities in Trauma)

Hiba Dhanani¹ · Zara Cooper^{1,2,3,4}

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Abstract

Purpose of Review To describe racial and ethnic disparities in trauma care and outcomes among older adults.

Recent Findings Compared to their younger counterparts, older adults have worse outcomes after trauma. Recent studies have investigated if there are differences in trauma care and outcomes for minoritized older adults.

Summary Trauma systems are caring for increasing numbers of older adults. Disparities in trauma care exist for older adults of racial and ethnic minorities. The root causes of these disparities are related to social and structural determinants of health. Reduction of disparities across racial and ethnic groups in older adults should focus on modifiable healthcare factors such as access to care and quality of care [1].

Keywords Race · Ethnicity · Trauma · Older · Geriatric · Disparities

SECTION 1: Introduction

Introduction

Social determinants are the “conditions in which people are born, grow, live, work, and age.” [2] Structural determinants include social and political structures, which may or may not be imbued with racism, classism, sexism, ageism, and other drivers of inequity [3, 4]. Race and ethnicity are social and structural determinants of health (SSDOH) associated with disparities during trauma care [5, 6]. Specific attention to SSDOH among older adults who sustain trauma is warranted, as the proportion of the population over 65 is rising. The number of older adults is estimated to double by 2040, and older adults are anticipated to comprise a quarter of the United States (US) population by 2060 [7]. Injury rates

among older adults are also increasing, with more than half (55%) of unintentional deaths attributed to falls [8]. Injury represents the 8th leading cause of death among older adults annually [9]. Disparities research focused on older adults is warranted because they differ from younger adults in ways that impact trauma care and outcomes (different physiology, increased comorbidities, fixed income) [10, 11]. This chapter describes racial and ethnic disparities in trauma care and outcomes among older adults.

Epidemiology

The Administration for Community Living Annual Report describes a 38% increase in adults aged 65 and older from 2010 to 2020, and the number of older adults is estimated to double by 2040 [12]. Currently, individuals identifying as White account for 75% percent of the population over 65 in the US. Demographic trends estimate that the number of older White individuals will increase by 26% by 2040, but racial and ethnic minorities will increase by 105% [12]. The COVID-19 pandemic revealed gaps in hospital-based and community resources for older adults, including limited numbers of geriatricians, skilled nursing and rehabilitation beds, and inpatient geriatric-centered hospital units (advanced care for elderly units) [13]. The pandemic magnified the challenges of providing age-friendly healthcare and prompted the National Academy of Medicine (NAM) to

✉ Zara Cooper
zcooper@bwh.harvard.edu

¹ Center for Surgery and Public Health, Brigham and Women’s Hospital, Boston, MA 02120, USA

² Center for Geriatric Surgery, Brigham and Women’s Hospital, Boston, MA 02120, USA

³ Department of Surgery, Brigham and Women’s Hospital, Boston, MA 02120, USA

⁴ Harvard University Medical School, Boston, MA 02120, USA

issue a special report calling for improved care and quality of life for older Americans [14]. The report identifies six policy recommendations for Congress to promote better health and health outcomes for older adults [15]. 1–Increase the workforce caring for geriatric patients by reducing student loans and increasing geriatric-centered education in professional training programs. 2–Incorporate healthy aging into public health. Healthy aging encompasses the conditions older adults need to live healthily, safely, and productively. To achieve this, the authors recommend partnerships between public health departments and community organizations to ensure access to fresh foods, exercise, and social engagement. 3–Remediate disparities and inequities through the establishment of cross-agency committees that implement policies and programs that eliminate SSDOH. Suggested interventions include criminal justice reform, expanded health insurance coverage with SSDOH related benefits, and partnerships with community-based organizations. 4–Adopt novel methods of care delivery including telehealth and remote sensors to prevent falls. 5–Increase access to palliative care by training all front-line clinicians in primary palliative care skills such as goals of care conversations and symptom management [16]. Lastly, the authors advise a redesign of long-term care, given the shortages of nursing home staff and beds. Recommendations include reimbursement modifications and incorporation of community-based organizations into home-based care.

Older adults have physiologic differences compared to younger adults that result in higher rates of morbidity and mortality with even low impact injuries [10, 11]. The American College of Surgeons Trauma Quality Improvement Program (ACS-TQIP) recognizes the need for tailored care of older adults and has published guidelines articulating steps stakeholders can take to improve the quality of care for older adults [17]. The American College of Surgeons-Advanced Trauma Life Support (ACS-ATLS) and the Eastern Association for Surgical Trauma (EAST) recommend age-specific care starting at 50 years, but institutional demarcations of age-specific care vary [18, 19].

Examples of SSDOH that Impact Older Adults

Racial biases of clinicians are well documented [20–22]. Examples of racism in trauma care of older adults include delayed time to imaging and fewer conversations about goals of care for individuals of racial and ethnic minorities compared to White individuals [23–25]. Ageism is another form of bias that can impact older adults. Ageism is negative beliefs and attitudes about older adults that includes assumptions about an individual's mental and physical capabilities, social skills, and political and religious beliefs. Similar to racism, the assumptions made through ageist attitudes can impact employment

and self-worth [26, 27]. In 2022, the American Geriatrics Society published a special report on the intersection of structural racism and ageism in the *Journal of the American Geriatrics Society (JAGS)* [28]. The authors note a dearth of literature about the interaction between ageism and racism and suggest three fundamental changes to build a just healthcare system: 1–increased racial diversity of medical professionals, 2–improved cultural dexterity training of the next generation of healthcare professionals and better support of the direct care workforce, and 3–examination of healthcare through an intersectionality lens of ageism and all other phobias and biases (ableism, sexism, homophobia, xenophobia). These recommendations are aligned with the recommendations in the NAM special report and emphasize the need for structural change to address racism and ageism in clinical practice. Interventions to remediate disparities secondary to SSDOH may require multiple components as SSDOH interact and affect one another [3, 4].

Due to racism and classism preventing minorities from accumulating wealth, older Black and Hispanic adults are more likely to have a lower SES compared to similarly-aged White adults [12, 29]. Wealth can affect decision making around long-term care (LTC), with individuals “spending down” to become eligible for LTC benefits offered by Medicaid [30]. Unlike younger adults, older adults of racial and ethnic minorities have similar rates of health insurance coverage as their White counterparts [31, 32]. Though previous studies use Fee-for-Service Medicare, in 2023 an estimated 51% of Medicare eligible older adults are enrolled in Medicare Advantage [31]. Older adults of racial and ethnic minorities are more likely to use Medicare Advantage compared to older White adults. Black and Hispanic individuals are enrolled in Medicare Advantage at rates of 59% and 67% compared to 43% of older White adults [33]. Findings related to disparities within quality of care and healthcare utilization among Medicare Advantage enrollees are varied [33]. Compared to White adults with Medicare Advantage, Black and Hispanic adults are more likely to be enrolled in a lower rated plan [34, 35]. There is limited data on Medicare Advantage and Medicare supplement plans, which contributes to disparities that are yet to be described.

Older Black and Hispanic patients have improved mortality outcomes after trauma compared to older White patients [5, 6]. This finding has been called “paradoxical”, and experts postulate that greater access to insurance coverage through Medicare explains this finding [36–38]. Survivorship and greater resilience among older Black individuals, as compared to Whites who reach the same age, are also theorized to act as contributors to better outcomes among Black patients [38, 39]. Despite a survival advantage after trauma, Black older adults continue to experience racial and ethnic disparities that adversely

affect trauma care and outcomes including less access to timely imaging and monitoring [23, 39], post-discharge rehabilitation services [40], and palliative care [41].

Racial differences in geographic access to primary care, hospitals, and trauma centers can also adversely affect trauma care and outcomes for older adults. In older adults, proximity to known medical care and patient preference are factors that drive where ambulances transport individuals [42]. The National Trauma Data Bank (NTDB) is a national database that aggregates data from trauma registries. In a study using NTDB data from 2007 to 2012, Zhou et al. examined rates of non-transfer from non-trauma centers to trauma centers in older adults meeting ACS transfer guidelines [43]. They found that rurality was associated with a higher rate of non-transfer to trauma centers. The authors speculate that lower rates of transfer in rural areas were due to concern that long transport times would be risky for patients and outweigh the benefit of care at a trauma center. Such treatment patterns disproportionately affect older adults who are more likely to live in rural areas than younger adults [29]. However, whether designated trauma centers have better mortality outcomes for older adults compared to community hospitals remains controversial [44, 45].

Lastly, lack of housing negatively effects recovery from trauma. Unhoused individuals have variable access to hygiene, safe storage of medications, and complex post-discharge care needs [46, 47]. Few studies specifically address outcomes among older adults experiencing homelessness after trauma; however, older adults are the fastest growing age group of those experiencing homelessness [48]. It is estimated that older adults comprise nearly half the total population of homeless adults in the US [48, 49]. While some older adults have experienced homelessness previously, a trend of older adults experiencing homelessness for the first time has emerged among the backdrop of increasing housing costs [48]. Older adults are particularly vulnerable to homelessness as many live on fixed incomes that are insufficient to cover their expenses. The health of older adults experiencing homelessness is worse than housed individuals of similar age [46–48]. Furthermore, health conditions associated with increasing age (hypertension, dementia, frailty) have been documented in unhoused individuals about 10 years earlier than their housed counterparts [50, 51]. Trauma in unhoused individuals is frequently due to blunt trauma secondary to assault [47]. Thus, it is imperative that trauma clinicians understand the accelerated aging associated with homelessness, and the impact of homelessness on the risk for assault and unintentional injury. Specific interventions to improve healthcare outcomes in older adults experiencing homelessness include provision of street-based health care and housing prescriptions [52, 53].

SECTION 2: Factors That Affect Response to Injury

Physiology

Older adults are at risk of poor outcomes after trauma due to physiologic changes associated with aging [10, 11]. Older adults have diminished respiratory reserve, are less able to tolerate metabolic disturbances, and are more likely to present with a normal respiratory rate despite progressing hypoxia and hypercarbia [54, 55]. Furthermore, older adults have baseline elevated systemic vascular resistance and decreased sensitivity to catecholamines, leading to a diminished response to hemorrhage that masks shock and may confound clinical care [56, 57]. Older adults also have high rates of comorbid conditions including hypertension, diabetes, and heart failure, that increase the risk of complications and mortality after surgery and trauma [11]. Relative to White individuals, individuals from racial and ethnic minorities have higher rates of chronic conditions, and are often diagnosed with them at younger ages [58–60].

Frailty

Frailty is a syndrome characterized by diminished physiologic reserve that increases vulnerability to injury or illness. Conceptually, frailty is independent of age, and is associated with worse recovery from illness and injury [61–63]. Experts have shown that frailty is more accurate than chronologic age in predicting adverse events in hospitalized older trauma patients including complications, readmission, mortality, and discharge to location other than home [64–67]. The Trauma-Specific Frailty Index (TSFI)[68] is a frailty measure based on 15 variables across domains including comorbidities, dementia, daily activities, health attitude, function, frequency of falls, and nutrition. It was prospectively validated in a cohort of older adults (≥ 65) admitted to a single level I trauma center from 2011 to 2013 prior to being externally validated and applied across 17 trauma centers in the United States [69]. Higher TSFI scores predicted worse clinical outcomes such as, readmission, complications, fall recurrence, discharge to a non-home location, and short-term and 3 month mortality. A study from the 2011 National Health and Aging Trends Study (NHATS), shows that even after controlling for comorbidities, older Black and Hispanic Americans (22.9 and 24.6%, respectively) were more likely to be frail compared to non-Black, non-Hispanic Americans ($< 14\%$) [70]. Despite high levels of frailty among minoritized older adults, the association of frailty with adverse outcomes after trauma in these groups has not been well established.

Weathering

The term weathering is used to describe the adverse health effects of racism and systemic inequality among marginalized groups including racial and ethnic minorities and migrants [71]. The prolific work of Dr. Arline Geronimus, a Professor of Public Health at the University of Michigan, has shown that “racist and classist ideologies activate biological processes [allostatic load] that wear out the physical and mental health of people of color across all economic classes.” [71] Allostatic load is a biologic measure of chronic exposure to environmental stressors [72], and has been used as a measure of weathering. Increased allostatic load and allostatic overload are the result of repeated exposure and adaptation to stressors. They are associated with early health deterioration, accelerated aging, and decreased cognitive and physical function [73–76]. Weathering helps to explain why individuals from racial and ethnic minorities develop major chronic comorbidities and die earlier relative to their White counterparts despite income parity [60]. The relationship with comorbidity and mortality was further investigated by British researchers who investigated associations between multimorbidity and frailty in a large, longitudinal cohort study of middle and older aged adults (2018) [77]. The researchers found that frailty in middle-aged adults with multimorbidity was significantly associated with mortality, even after adjusting for long-term conditions, socioeconomic factors, and lifestyle. This study and the work of Dr. Geronimus demonstrate that physiologic burden precedes older age and can significantly impact health outcomes. Previous work on trauma outcomes has demonstrated that older Black adults have improved mortality compared to older White adults [6, 78], but researchers relate this finding to survivorship and physiologic resilience [71, 78]. In essence, minoritized adults who reach older age have done so despite higher allostatic loads and less access to healthcare. Trauma clinicians should be aware that adults who are subject to racism and other structural and social disadvantages may manifest clinical frailty in middle age, due to weathering.

Dementia

In a national sample of older adults (2019), prevalence of dementia among non-Hispanic Blacks, Hispanics, and non-Hispanic Whites was 14.7%, 12.9%, and 11.3% respectively [79]. Older adults with dementia are more likely to fall (45.5% versus 30%) [80], which can lead to hip fracture, traumatic brain injury (TBI), and loss of both function and independence. Falls themselves can also be a marker of preclinical dementia [81]. Compared to age-matched White individuals, Black and Hispanic individuals have higher rates of dementia, and the disease is more severe when diagnosed [82, 83]. However, investigators speculate that this

is due to normalization of memory loss as part of aging, delayed diagnosis by clinicians, and delayed access to care.

SECTION 3: Selected Causes of Injury in Older Adults

Falls

Falls are the most common cause of injury among older adults and can have devastating consequences. In adults over 65, falls account for 75% of all trauma [84]. Negative outcomes associated with falls include loss of function, cognitive decline, and increased mortality [11]. Rates of fall vary between racial and ethnic groups. A meta-analysis by Wehner-Hewson et al. using national data on racial and ethnic differences in fall rates from 1997–2020 noted rates of fall for Black and Hispanic individuals to be 18.6% and 18.5%. White individuals had a fall rate of 23.8%, and Asian individuals had a rate of 13.9% [85]. Other national studies demonstrate similar findings of increased fall rates among White individuals compared to Black individuals, but equivalent or higher rates of falls among Hispanic individuals [85–87]. Using data from the 2000–2010 Health and Retirement Survey (HRS), a nationally representative longitudinal survey of US adults aged 50 years and older funded by the National Institute on Aging, researchers explored racial and ethnic disparities in fall probability and frequency, and found that Black respondents were less likely to report a fall compared to other racial or ethnic groups [87]. Risk factors for fall include difficulty walking, cognitive decline, uneven physical environments, and fear of falling [88]. However, the ability to quantify these risk factors is limited. Using data from the 2013 Medicare Beneficiary and Summary File, Sairafian et al. found that although older Black individuals were less likely to report a fall compared to White adults, they were more likely to report risk factors associated with falls including, difficulty walking, difficulty kneeling, and cognitive decline [86]. A key limitation of existing studies is that self-reported falls may be lower than the actual number of falls that participants experience. In these studies, it is unclear why older Black adults were less likely to report falls.

Non-White adults are more likely to live in areas with lower walkability, characterized by less proximity to amenities, street connectivity, perceived safety, as well as sidewalk unevenness, that increases their risk for falls [89–93]. The Walk Score [94] is a validated public tool that determines walkability using geospatial analysis to identify differences in walkability based neighborhood composition [90, 91]. In a national sample of neighborhoods, Black and Latinx low-income neighborhoods had lower Walk Scores compared to low-income White neighborhoods, and regardless of income,

Black neighborhoods had lower Walk Scores than other neighborhoods [90]. Cities in the southern United States had the largest differences in walkability by racial and ethnic groups [90]. There are ongoing efforts between community organizations and municipalities to create age-friendly environments that reduce fall risks including, uneven sidewalks, poor lighting, and limited seating [95–97]. For example, the Massachusetts' based community organization Pioneer Valley Planning Commission designed an age-friendly walking toolkit to advise city planners to consider direct routes, sidewalks, and lighting that ensure older adults feel safe walking to their destination [95]. Several fall prevention programs have been associated with decreased fall rates through the use of balance exercises and gait training [98–100]. The “A Matter of Balance” program provides education about fall risks to increase confidence in walking and overall activity, and has been translated into Chinese and Spanish [98, 99]. Other programs utilize the balance training of Tai Chi [100] or have formal partnerships with physical therapists [98].

Traumatic Brain Injury (TBI)

Adults over age 75 account for 32% of TBI-related hospitalizations and 28% of TBI-related deaths [101]. Older adults who take anticoagulation or antiplatelet agents are more susceptible to TBI due to their increased risk of bleeding after injury [11]. Symptoms of TBI may be delayed in older adults due to brain atrophy and increased intracranial space. Baseline cognitive impairment can complicate clinical evaluations related to the diagnosis and management of TBI [11]. TBI in older adults is associated with slower recovery, increased length of stay, and increased mortality compared to younger adults [39, 102].

Racial and ethnic disparities exist in TBI care during trauma admission and recovery. In a study of older adults using ACS-TQIP data (2017–2019), Hosseinpour et al. found that Black race was associated with decreased mortality, and lower rates of discharge to skilled nursing facilities [39]. They also found that cerebral monitoring was less likely to be used for Black patients when indicated based on published recommendations from the Brain Trauma Foundation [103]. A prospective cohort study of older adults at two level 1 trauma centers in Florida from August 2019 to August 2020, showed that older Black adults waited 8.2 min longer to undergo posttraumatic computed tomography (CT) of the head compared to White and Hispanic adults after controlling for trauma status, reason for head CT, physical exam findings, and Glasgow Coma Score [24]. The authors speculated that a cause of this disparity was clinician bias against racial and ethnic minorities. In their study, the authors did not measure time between key triage and diagnostic points such as triage, rooming, physician exam, ordering of imaging, and transport to CT. However, they suggest

that measurement of these steps will provide more clarity on the role of clinician bias in time to imaging. Prolonged wait times for CT scans are consistent with a larger body of literature describing race-related delays in care.

Individuals of racial and ethnic minorities are less likely to receive post-discharge rehabilitation services after TBI. In a retrospective study using NTDB data from 2007 to 2014, American Indians/Alaska Natives (AI/AN) were found to have a lower odds of discharge to skilled nursing facilities or subacute rehabilitation facilities, as well as lower odds of discharge home with health services compared to White individuals despite matched injury severity scores (ISS) [104]. However, subjects were not stratified by age so it is not possible to draw conclusions about associated differences in discharge locations with age. A retrospective study using data from the NTDB (2007–2010) demonstrated that among a national cohort of propensity-matched Medicare beneficiaries, Black and Hispanic individuals were less likely to be discharged to rehabilitation or went to lower levels of care compared to their matched White counterparts [40]. Literature on racial and ethnic disparities and access to post-acute care in older adults after trauma is limited. However, access to post-acute care is an important component of trauma recovery that may be mitigated by insurance type, geography, and other SSDOH.

Hip Fracture

Hip fracture affects 300,000 older adults annually and often requires hospital admission and surgery [105]. Ninety percent of hip fractures in older adults occur after falls from standing [106]. Hip fractures mark a sentinel event in the lives of older adults as the injury confers increased risk for one-year mortality and loss of independent living [107]. Time to surgery is a quality indicator in hip fracture care [108]. The TQIP database provides standardized data from ACS designated Level I and II trauma centers. Using ACS-TQIP to be consistent data from 2006–2016, Jarman et al. found that Black patients were more likely to experience longer wait times for hip fracture evaluation, longer hospital stay, and higher rates of inpatient complications [109]. Dy et al. similarly evaluated race based disparities using the New York Statewide Planning and Research Collaborative Database (1998–2010), and found that Black and Asian patients were more likely than others to undergo delayed hip fracture repair surgery despite similar measures of social deprivation (measured by the Area Deprivation Index) [110]. The above studies and others show that insurance type and socioeconomic status alone do not explain the difference in time to surgery between older White and non-White adults with hip fractures [23, 110, 111].

Disparities in osteoporosis screenings have been described among racial and ethnic minorities and may affect

differences in hip fracture rates. The United States Preventative Services Task Force recommends dual x-ray absorptiometry DEXA osteoporosis screenings for women over age 65 and men over 70 [112]. Osteoporosis confers a higher-level risk of fracture. Multiple studies have found that Black and Hispanic individuals are less likely to receive DEXA screening [113]. Decreased screening is associated with lower rates of treatment and a higher burden of osteoporosis-related fractures [113–115]. A systematic review of causes of disparities in DEXA screening identified decreased referral rates, limited time for shared decision making, provider bias, assumptions of different bone biology among Black and White patients by clinicians, and overemphasis on the decreased fracture risk in minority patients as contributors to different screening rates [113].

SECTION 4: End of Life Preparation and Palliative Care

Racial and ethnic minority individuals are less likely to receive palliative care after trauma [25, 116, 117]. Early integration of end-of-life (EOL) care and palliative care is recommended by the ACS-TQIP guidelines [118], but access to specialty palliative care varies across trauma centers due to limited staffing and underutilization of consultation services [117, 119–121].

Goals of care conversations are a component of palliative care in which patients, their families, and clinicians discuss prognosis, values, treatment options, and care planning. ACS-TQIP geriatric trauma guidelines recommend that clinicians engage patients, surrogates, and families in goals of care discussions within 72 h of admission [17]. A retrospective study at an urban Level I trauma center (2017–2019),

found that Black and Hispanic patients were less likely to receive palliative care processes than White patients, including, documentation of an advanced directive, limitations in withdrawal of life-sustaining treatment, and palliative care consultation. Black patients who died were also more likely to have more invasive procedures than White patients prior to the end of life [116]. Black and Hispanic individuals have previously been reported to have lower rates of withdrawal of life-sustaining treatment and hospice at the end of life [122–124]. Authors from these studies postulate that Black and Hispanic individuals may undergo more invasive therapy at the end of life due to patient preference and cultural expectations of care, lack of culturally dexterous clinician-led discussions, and lower rates of advance care planning (ACP) before trauma [122–124]. Hypothesized explanations for the differences in palliative care and end of life care between White and Black individuals are summarized in the table below (Table 1).

SECTION 5: Conclusion

The intersection of older age and race is understudied in trauma patients. However, given the increasing numbers of older adults experiencing trauma, and the increasing numbers of older adults who are ethnic and racial minorities, there is an urgent need to better understand how SSDOH such as housing, ageism, racism, and other differences between racial and ethnic groups are associated with outcomes after injury and to in turn develop interventions to reduce inequities. Institutional and governmental policy changes are needed to dismantle inequities perpetuated by SSDOH. These are the first steps towards rectifying

Table 1 Racial and Ethnic Disparities in Palliative and End of Life Care

Domain	Hypothesized Causes of Disparity	Authors
Specialty Palliative Care	Lack of geographic or institutional access Patients' perceived view of suffering, death, and dying Patient distrust of clinicians and the health care system Less favorable attitudes towards palliative care (end of life)	Johnson et al.[25] Aaron et al.[125]
Withdrawal of Life Sustaining Treatment	Patient preference Culturally informed views of death, and dying Patient distrust of clinicians and the health care system	Hornor et al.[116] Hanna et al.[123] Williams et al.[122] Kutney-Lee et al.[126, 127]
Advance Care Planning	Spirituality Culturally informed views of death, and dying Lack of social support networks Barriers to utilization Patient distrust of clinicians and the health care system	Bullock et al.[128, 129] Johnson et al.[25] Shen et al.[128, 129]
Hospice	Financial burden Care setting or geographic location Patient distrust of clinicians and the health care system Perceived patient attitudes towards hospice care (less favorable)	Aaron et al.[125] Johnson et al.[130]

disparities in healthcare access and outcomes for older adults who sustain trauma.

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Data Availability No datasets were generated or analysed during the current study.

Declarations

This article does not contain any studies with human or animal subjects performed by any of the authors.

Competing Interests The authors declare no competing interests.

Disclaimer The views expressed are the authors' own.

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