

ORIGINAL ARTICLE

Racial/Ethnic Disparities in Mental Health Over the First 2 Years After Traumatic Brain Injury: A Model Systems Study



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Abstract

Objective: To determine whether racial/ethnic disparities occur in depression, anxiety, and satisfaction with life at 1 and 2 years postdischarge.

Design: A prospective, longitudinal, multicenter study of individuals with traumatic brain injury (TBI) participating in the National Institute on Disability and Rehabilitation Research Traumatic Brain Injury Model Systems project. Medical, demographic, and outcome data were obtained from the Model Systems database at baseline, as well as 1 and 2 years postdischarge.

Setting: A total of 16 TBI Model Systems hospitals in the United States.

Participants: Individuals with moderate or severe TBI (N = 1662) aged 16 years or older consecutively discharged between January 2008 and June 2011 from acute care and comprehensive inpatient rehabilitation at a Model Systems hospital.

Intervention: Not applicable.

Main Outcome Measures: The Patient Health Questionnaire-9, Generalized Anxiety Disorder 7-item scale, and Satisfaction with Life Scale assessed depression, anxiety, and satisfaction with life at 1 and 2-year follow-ups.

Results: After controlling for all possible covariates, hierarchical linear models found that black individuals had elevated depression across the 2 time points relative to white individuals. Asian/Pacific Islanders' depression increased over time in comparison to the decreasing depression in those of Hispanic origin, which was a greater decrease than in white individuals. Black individuals had lower life satisfaction than did white and Hispanic individuals, but only marginally greater anxiety over time than did white individuals and similar levels of anxiety as did Asian/Pacific Islanders and Hispanic individuals.

Conclusions: Mental health trajectories of individuals with TBI differed as a function of race/ethnicity across the first 2 years postdischarge, providing the first longitudinal evidence of racial/ethnic disparities in mental health after TBI during this time period. Further research will be required to understand the complex factors underlying these differences.

Archives of Physical Medicine and Rehabilitation 2014;95:2288-95

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Traumatic brain injury (TBI) is a primary cause of death and disability in the United States¹ and is the "hallmark injury" of military personnel deployed in the current wars in Iraq and Afghanistan.² Approximately 1.7 million TBIs occur each year, leading to 53,000 deaths.¹ Greater TBI impairments are associated with numerous functional problems, including difficulty maintaining

employment,³ marital instability,⁴ and psychological distress.⁵⁻⁷ Most individuals with TBI report depressive symptoms,⁸ and depressed individuals with TBI are more likely to experience comorbid anxiety,^{8,9} aggressive behavior, and suicidal ideation,¹⁰ as well as reduced executive functioning, social functioning,⁹ and satisfaction with life.⁶

Rehabilitation outcomes are associated with demographic and cultural characteristics. Being of a racial/ethnic minority and

Disclosures: none.

having TBI has been linked to reduced competitive employment,¹¹ less engagement in leisure activities, less community integration,¹² lower standard of living,¹³ lower likelihood of entering a rehabilitation facility after discharge from a trauma unit,¹⁴ and higher mortality rates.¹⁵ Compared with white individuals, at 1 year postdischarge black individuals report lower satisfaction with life¹⁶ and Hispanic individuals report greater depression.¹⁷ Among individuals without TBI, black and Hispanic individuals have a lower likelihood of receiving a depression diagnosis than do white individuals^{18,19}; however, there remain disparities for these 2 groups in primary care for diagnoses, counseling/referrals, and prescription of antidepressant medication in the treatment of depression and anxiety.²⁰ In addition, black and Hispanic individuals are less likely to report being very satisfied with their lives relative to their white counterparts.²¹ Although racial/ethnic disparities have begun to be documented, research has briefly explored differences in mental health and no studies have examined differences longitudinally. This study used hierarchical linear modeling to examine racial/ethnic differences in depression, satisfaction with life, and anxiety in a national sample of individuals with TBI at 1 and 2 years postdischarge.

Methods

Participants

Participants were from the National Institute on Disability and Rehabilitation Research Traumatic Brain Injury Model Systems (TBIMS) national study, a multicenter longitudinal study assessing TBI outcomes.²² Participants met criteria for TBI, which includes trauma to the brain tissue owing to an external mechanical force as demonstrated by loss of consciousness, post-traumatic amnesia (PTA), or skull fracture, or objective neurological outcomes attributed to brain injury through physical or mental status examinations.²²

Participants (1) had a self-reported race/ethnicity of white, black, Asian/Pacific Islander, or Hispanic origin; (2) had been 16 years or older at the time of injury; (3) had been admitted to 1 of the 16 TBIMS hospitals for acute care within 72 hours of injury for moderate or severe TBI; and (4) had been admitted to comprehensive inpatient rehabilitation at a TBIMS hospital.²² To be included in the current analyses, participants must have had data for at least 1 time point at either 1 year or 2 years postinjury for each mental health variable (depression, anxiety, and satisfaction with life). Participants had to have been hospitalized between January 15, 2008, and June 30, 2011, to be included because this is when the 3 mental health variables (Patient Health Questionnaire-9 [PHQ-9], Satisfaction with Life Scale [SWLS], and Generalized Anxiety Disorder 7-item [GAD-7] scale) were generally collected simultaneously across the TBIMS centers.

For the current analyses, 1662 individuals met study criteria. See [table 1](#) for a summary of the sample's demographic characteristics.

List of Abbreviations:

GAD-7	Generalized Anxiety Disorder 7-item
HLM	hierarchical linear modeling
PHQ-9	Patient Health Questionnaire-9
PTA	posttraumatic amnesia
SWLS	Satisfaction with Life Scale
TBI	traumatic brain injury
TBIMS	Traumatic Brain Injury Model Systems

Table 1 Sample (N=1662) characteristics

Characteristic	Value
Sex	
Male	1196 (72.0)
Female	466 (28.0)
Missing	0 (0)
Age at injury (y)	41.10±18.74
Missing	0 (0)
Marital status	
Single	762 (45.8)
Married	565 (34.0)
Divorced	205 (12.3)
Separated	50 (3.0)
Widowed	76 (4.6)
Other	2 (0.1)
Missing	2 (0.1)
Annual earnings (US \$)	
None	561 (33.8)
≤9,999	184 (11.1)
10,000–19,999	164 (9.9)
20,000–29,999	159 (9.6)
30,000–39,999	141 (8.5)
40,000–49,999	97 (5.8)
50,000–59,999	84 (5.1)
60,000–69,999	61 (3.7)
70,000–79,999	30 (1.8)
80,000–89,999	21 (1.3)
90,000–99,999	22 (1.3)
≥100,000	78 (4.7)
Missing	60 (3.6)
Weekly paid competitive employment	30.02±24.07
Missing	22 (1.3)
Education (y)	12.91±2.71
Missing	11 (0.7)
Days in PTA	22.41±20.77
Missing	217 (13.1)
Glasgow Coma Scale score	11.51±4.00
Missing	18 (1.1)

NOTE. Values are n (%) or mean ± SD.

The TBIMS database classifies race and ethnicity together using the following categories: white non-Hispanic, black non-Hispanic, Hispanic origin, and Asian/Pacific Islander. It should be noted that this categorization method is limited because it minimizes a very heterogeneous range of ethnicities. These categories are used for the present study because these were collected in this manner by the TBIMS and constitute the standard classification for data collection and research despite the potential lack of important nuance. There were 2 missing data points for marital status, 11 for education, 22 for weekly paid competitive employment (4 refused, 5 were missing, and 13 were unknown), and 60 for annual earnings (25 refused, 31 did not know, and 4 were missing). There were 217 missing data points for days in PTA (187 individuals were still unconscious or had amnesia at discharge and 30 had an unknown PTA score), and 18 data points were missing for the Glasgow Coma Scale²³ score at admission. There were 122 missing data points for year 1 depression, 588 for year 2 depression, 120 for year 1 satisfaction with life, 590 for year 2 satisfaction with life, 612 for year 1 anxiety, and 584 for year 2 anxiety.

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