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Association Between Self-Reported Disability and Lifetime History of Traumatic Brain Injury With Loss of Consciousness Among Veterans and Nonveterans in North Carolina

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Abstract

Background: Compared with civilians, service members and veterans who have a history of traumatic brain injury (TBI) are more likely to experience poorer physical and mental health. To investigate this further, this article examines the association between self-reported history of TBI with loss of consciousness and living with 1 or more current disabilities (ie, serious difficulty with hearing, vision, cognition, or mobility; any difficulty with self-care or independent living) for both veterans and nonveterans.

Methods: A cross-sectional study using data from the North Carolina Behavioral Risk Factor Surveillance System for 4733 veterans and nonveterans aged 18 years and older.

Results: Approximately 34.7% of veterans residing in North Carolina reported having a lifetime history of TBI compared with 23.6% of nonveterans. Veterans reporting a lifetime history of TBI

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had a 1.4 times greater risk of also reporting living with a current disability (adjusted prevalence ratiocompared with nonveterans. The most common types of disabilities reported were mobility, cognitive, and hearing. = 1.4; 95% confidence interval, 1.2–1.8)

Conclusions: Compared with nonveterans, veterans who reported a lifetime history of TBI had an increased risk of reporting a current disability. Future studies, such as longitudinal studies, may further explore this to inform the development of interventions.

Keywords

brain injury; cognition disorders; concussion; neurologic disorders; traumatic

SUSTAINING A TRAUMATIC BRAIN INJURY (TBI) of any severity level is associated with an increased risk of having a short- or long-term disability among both civilians and veterans.[1,2] However, compared with civilians, service members and veterans who have a history of TBI are more likely to experience poorer physical and mental health (eg, depression, post-traumatic stress disorder [PTSD]) that may affect not only their ability to perform daily activities but also their overall quality of life.[3–5] Currently, estimates of the prevalence of TBI-related disability among veterans and civilians living in the United States have been challenging to obtain because of the lack of a national surveillance system.[1] A study by Selassie and colleagues,[6] published in 2008, estimated that almost 125 000 Americans per year who are hospitalized for a TBI will experience long-term disability and will likely need rehabilitative care. Furthermore, Zaloshnja and colleagues[7] estimated that 1.1% of the US civilian population were living with a long-term disability from TBI at the beginning of 2005. These estimates are extrapolations of state-based data on hospital discharge records and are more than a decade old. Thus, recent changes in TBI morbidity among the civilian population, such as increases in TBIs among older adults and from self-harm,[8] as well as the military conflicts from 2005 to 2018 that increased the proportion of veterans living with TBI,[9] are not accounted for in these estimates. Lack of current data on disabilities among both civilians and veterans with a history of TBI inhibits the development of targeted public health programs and services for people living with TBI.

While a causal relationship cannot be determined, survey data obtained from states that administrated questions on TBI in the Behavioral Risk Factor Surveillance System (BRFSS) allow for an examination of the relationship between lifetime history of TBI and living with a current disability.[10] Using data from the 2014 Ohio BRFSS, Corrigan and colleagues[10] found that adults with a history of TBI with loss of consciousness (LOC) were more likely to report a current disability than adults with no history of TBI with LOC. This relationship strengthened as the number of TBIs or the severity level of the worst TBI increased.[10] Using a similar methodology, this exploratory article examines the association between self-reported history of TBI with LOC and living with 1 or more current disabilities (ie, serious difficulty with hearing, vision, cognition, or mobility; any difficulty with self-care or independent living) among residents in North Carolina using data from the 2018 North Carolina BRFSS. However, this article expands upon previous findings by also reporting the association of lifetime history of TBI with LOC, hereafter referred to as lifetime history of TBI, and current disability among veterans who reside in the state.

METHODS

Study population

The BRFSS[11] is an annual, population-based representative telephone survey of noninstitutionalized US adults, aged 18 years and older in each state and the District of Columbia. The BRFSS collects information pertaining to health-related conditions and health behaviors. The BRFSS employs a complex sampling design[12]; it uses a disproportionate stratified sample design for respondents who complete the survey by landline and a random sample design for those who complete the survey by cell phone. The BRFSS also uses iterative proportional fitting to weight the data. The BRFSS data are de-identified and are considered exempt from human subjects review by the Centers for Disease Control and Prevention's (CDC's) Institutional Review Board. Analyses for this study used data from only North Carolina BRFSS respondents. The TBI-related questions were included as part of an optional module that was administered by a small number of states. It was not possible to combine data from the states that administered the optional TBI module in 2018, as the optional TBI module varied between states. In 2018, the entire sample in North Carolina (n = 4733) completed both the core sections of the BRFSS and the TBI module for a response rate of 43.5% (see Figure 1). For comparison, the median response rate among states/territories for the overall BRFSS is 49.9%.

Lifetime history of TBI with LOC

The TBI optional module is a modified version of the Ohio State University TBI Identification Method (OSU TBI-ID)[13] that included questions on lifetime history of TBI with LOC. After completing the core sections of the BRFSS, the TBI module was administered along with other state-added modules. For the TBI module, all respondents received the following prompt:

For these next questions, please think about injuries you have had during your entire lifetime, especially those that affected your head or neck. It might help to remember times you went to the hospital or emergency room. Think about injuries you may have received from a car or motorcycle wreck, bicycle crash, being hit by something, falling down, being hit by someone, playing sports or an injury during military service.

This prompt was followed by the questions "Thinking about any injuries you have had in your lifetime, were you ever knocked out or did you lose consciousness?" Responses to this first question were dichotomized as yes/no. If respondents answered "yes" to the first question, they were then asked, "What was the longest time you were knocked out or unconscious?" Three answer choices, which may be used to determine TBI severity level, included the following: less than 30 minutes, between 30 minutes and 24 hours, and 24 hours or longer. Because of sample size, responses used to determine TBI severity level were dichotomized as mild (<30 minutes of LOC) or moderate/severe (≥30 minutes of LOC). In addition, the respondents who answered "yes" to the initial TBI question were then asked, "How old were you the first time you were knocked out or lost consciousness?"

Living with a current disability

The United States Department of Health & Human Services recommends the inclusion of 6 questions in the BRFSS to estimate the prevalence of people living with a disability.[14] Current disability status was measured by combining these 6 questions from the core section of the 2018 North Carolina BRFSS. Before asking the questions on disability, the participants were told: "The following questions are about health problems or impairments you may have." The 6 questions on disability included the following: (1) "Some adults who are deaf or have serious difficulty hearing may or may not use equipment to communicate by phone. Are you deaf or do you have serious difficulty hearing?" (hearing disability); (2) "Are you blind or do you have serious difficulty seeing, even when wearing glasses?" (vision disability); (3) "Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making a decision?" (cognitive disability); (4) "Do you have serious difficulty walking or climbing stairs?" (mobility disability); (5) "Do you have difficulty dressing or bathing?" (self-care disability); and (6) "Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?" (independent living disability). Disability status was dichotomized as yes if respondents answered "yes" to any of these 6 questions and no if respondents answered "no" to all 6 disability questions. An analysis was conducted to determine the association between each type of current disability and history of TBI among all individuals in North Carolina and between veterans and nonveterans with a lifetime history of TBI. In addition, to assess the presence of multiple disabilities that may indicate the need for specialized care, the number of disabilities was calculated by summing across any yes responses to any of the 6 disabilities and categorized into a binary variable (1 or 2 or more).[10]

Veterans and nonveterans with a lifetime history of TBI

As mentioned, a secondary analysis was conducted to determine the association between each type of current disability and number of disabilities among veterans and nonveterans with TBI. The variable "veterans versus nonveterans with a lifetime history of TBI" was dichotomized as veterans if respondents answered "yes" to the veteran status and lifetime history of TBI question and nonveterans if respondents answered "no" to the veteran status and "yes" to the lifetime history of TBI question.

Statistical analysis

Descriptive and bivariate statistics were calculated to describe the demographic characteristics (sex, age, race/ethnicity, marital status, educational attainment, employment status, and federal poverty level[15]) and differences of North Carolina veteran and nonveteran adults (see Table 1). These statistics were limited to those who answered "yes" or "no" to the question on lifetime history of TBI. Bivariate statistics were calculated to determine which demographic characteristics and TBI variables ("lifetime history of TBI," "TBI severity," and "veterans vs nonveterans with lifetime history of TBI") were associated with the disability outcomes (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495). Demographics that were not the main predictors of interest (the TBI variables) and were associated with the disability outcomes were added as covariates

in the final model. The bivariate statistics were also limited to those who answered the question on lifetime history of TBI and the respective disability question(s). To determine the association between the TBI variables with disability outcomes, logistic regression with predicted marginals[16] was used to create models and adjusted for the demographic characteristics that were significant in the bivariate tests found in Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495. Furthermore, confounding was assessed using a change in parameter estimate of 10%[17,18] when the model was run with and without suspected confounders. Suspected confounders were variables that were associated with the main predictors of interest (the TBI variables). The final multivariable binomial logistic regression models were formed from variables that either had a significant association ($P \leq .05$) with the outcome or resulted in at least a 10% change of the parameter estimate (see Figure 2). Associations are presented as adjusted prevalence ratios (APRs). In addition, multicollinearity between the demographic characteristics was assessed for each multivariable binomial logistic regression model. Separate analyses were conducted for each of the disability outcome variables (disability status, disability type, and number of disabilities). The significance level of the tests was set at $\alpha = .05$. All analyses were performed in SAS 9.4 (SAS Institute, Cary, North Carolina) and SUDAAN version 11.0.0 (Research Triangle Institute, Research Triangle Park, Cary, North Carolina), taking the complex survey design into account and incorporating the design weight, strata, and the primary sampling unit.

RESULTS

Of the 4686 respondents in the survey, 3570 (76%) answered the lifetime history of TBI question. Respondents who did not answer this question compared with those who did were different on all demographic characteristics (except for marital status), as well as the reported outcome disability variables (data not shown). A higher percentage of those who answered were female, older, had some college education, were out of work or unable to find work or were a homemaker or student or retired, less than 200% or less of the federal poverty-level income, were non-Hispanic White, nonveterans, had a higher percentage of any disability and disabilities in cognition, hearing, independent living, mobility, self-care, and vision, and had a greater number of disabilities.

Demographic characteristics among veteran and nonveteran residents in North Carolina

There were significant demographic differences between veterans and nonveterans. For example, a higher percentage of veterans than nonveterans were male, non-Hispanic Black, married, had some college, were homemakers/students/retired, and had an income that was 200% of the federal poverty level and higher. The mean age of veterans was also significantly higher than the mean age of nonveterans (see Table). Among veterans residing in North Carolina, approximately 34.7% reported having a lifetime history of TBI compared with 23.6% of nonveterans. Approximately 41.6% of veterans and 29.8% of nonveterans in North Carolina self-reported living with 1 or more disabilities at the time the survey was administered. Among veterans, the most common type of disability was mobility- (21.9%), followed by hearing- (19.1%) and cognitive- (16.8%) related disabilities. However, for nonveterans, the most common disabilities included mobility (16.1%), followed by

cognitive- (12.5%) and independent living– (8.3%) related disabilities. Among those reporting a disability, approximately the same percentage of veterans reported living with 1 (50.1%) as with 2 or more (49.9%) current disabilities. Nonveterans with a disability reported similar percentages (1 disability = 53.0%; 2 or more disabilities = 47.0%).

Association between lifetime history of TBI and living with a current disability among residents of North Carolina

The prevalence of disability among those with a lifetime history of TBI was 42.6% while the prevalence of disability among those who did not have a lifetime history of TBI was 27.3% (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495). After adjustment for demographic and/or confounding factors that were significantly associated with having a disability (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495), lifetime history of TBI among all residents of North Carolina was associated with increased risk of having any disability (APR = 1.6; 95% confidence interval [CI], 1.4–1.7) (see Figure 2). Among all residents of North Carolina who had a lifetime history of TBI, there was an increased risk of having a disability related to hearing (APR = 1.7; 95% CI, 1.3–2.2), vision (APR = 1.9; 95% CI, 1.3–2.6), cognition (APR = 2.3; 95% CI, 1.8–2.8), mobility (APR = 1.5; 95% CI, 1.3–1.8), self-care (APR = 1.9; 95% CI, 1.3–2.8), and independent living (APR = 2.2; 95% CI, 1.6–2.9) compared with residents who did not have a lifetime history of TBI. In addition, among all residents of North Carolina, having a lifetime history of TBI was also associated with a greater number of disabilities (2 or more vs 1: APR = 1.3; 95% CI, 1.1–1.5) compared with those without a lifetime history of TBI.

After adjustment for demographic and/or confounding factors that were significantly associated with having a disability (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495), TBI severity was not associated with overall disability status (APR = 1.2; 95% CI, 0.95–1.5). However, having a lifetime history of a moderate/severe TBI was associated with increased risk of having a disability related to vision (APR = 1.8; 95% CI, 1.1–3.1), cognition (APR = 1.6; 95% CI, 1.2–2.2), and mobility (APR = 1.4; 95% CI, 1.03–1.8) compared with individuals having a lifetime history of mild TBI (see Figure 2). Neither the bivariate association between TBI severity and having a disability related to hearing, self-care, and independent living nor number of disabilities was statistically significant (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495); thus, no multivariable modeling was conducted for these variables.

Associations between lifetime history of TBI and veteran status with current disability

The prevalence of disability among veterans with a lifetime history of TBI was 52.2% while the prevalence of disability among nonveterans with a lifetime history of TBI was 40.8% (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495). After adjustment for demographic and/or confounding factors that were significantly associated with having a disability (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495), being a veteran with a lifetime history of TBI in North Carolina was associated with increased risk of having any disability (APR = 1.4; 95% CI,

1.2–1.8) and a disability related to hearing (APR = 2.0; 95% CI, 1.3–3.1) (see Figure 2) as compared with nonveterans with a lifetime history of TBI. The bivariate association between lifetime history of TBI between veterans and nonveterans in North Carolina and with having a disability related to vision, cognition, mobility, self-care, and independent living was not statistically significant (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JHTR/A495). Thus, no multivariable modeling was conducted for these variables.

DISCUSSION

Findings from this article suggest that approximately one-third of veterans and a quarter of nonveterans residing in North Carolina have sustained a TBI in their lifetime. Compared with nonveterans, veterans who reported a lifetime history of TBI had an increased risk of reporting a current disability. While it is likely that many of these individuals have a disability that was not due to their TBI, the significant association between having a lifetime history of TBI and living with a current disability identifies a group that may warrant attention. In-depth retrospective studies could explore this relationship and inform the development of targeted interventions. However, to our knowledge no current data system includes this information. Until a national surveillance system to capture TBI data is created, estimating the true burden of disability that resulted from a TBI in the United States will be an ongoing challenge.

The most common types of disabilities found in this study were mobility, cognitive, and hearing. Disabilities of many types—including the ones listed previously— are a common consequence of TBI.[1] Previous research has found that the most common type of disability experienced by TBI survivors is cognitive in nature, particularly related to memory loss or difficulty forming new memories.[1] Potentially related to the disabilities that an individual experiences, sustaining a TBI is associated with increased incidence of mental illness, challenges with social integration, difficulties with employment, activity limitations, and lower self-reported quality of life.[1,19–22] Expanded access to rehabilitative services, including mental health services and job training programs, may be beneficial to support individuals living with a TBI and improve their well-being.[1]

According to the US Department of Veterans Affairs, North Carolina ranks eighth among US states with the highest population of veterans.[23] Approximately half of the veterans in the state who self-reported a lifetime history of TBI also reported at least 1 current disability. Previous research has found that service members who sustain a TBI during combat may have more detrimental sequelae than service members who did not sustain a TBI during combat.[24] This may be associated with the circumstances in which they sustained their injuries (eg, increased likelihood of polytrauma) and potential for comorbid conditions (eg, PTSD).[2,24] While the exposure to combat increases the risk for TBI, such as those from a blast-related injury,[9] approximately 80% of TBIs among service members and veterans occur in nondeployed settings (eg, motor vehicle crashes).[2] There is some evidence to suggest that veterans may have difficulty accessing healthcare or experience long wait times for care at federally funded facilities (especially among those living in rural areas).[25] Moreover, research suggests that veterans have an increased risk for psychological

comorbidities (eg, PTSD, depression),[26] have some unique factors that may contribute to high rates of suicide,[27] and are more likely to experience postconcussive symptoms than civilians.[28] In addition, as noted in this study, veterans are more likely than nonveterans to have a hearing disability.[29] Taken together, these findings point to the distinctive needs that veterans face for their overall health and when recovering from a TBI. They also highlight the importance of efforts to improve rehabilitation services for veterans with TBI complicated by psychological conditions and inclusive of interventions to facilitate the transition from military to civilian life.[2]

For people with a lifetime history of TBI, the higher rate of disability as compared with the general population in North Carolina, often in more than 1 functional domain, suggests the need for a collaborative care approach among healthcare (eg, primary care providers, specialists, rehabilitative service providers) and public health professionals. For example, persons living with a TBI and a mobility disability may experience environmental and transportation barriers accessing healthcare services, whereas those with a TBI and a cognitive disability may have difficulty understanding or adhering to self-care practices. Furthermore, people living with a TBI, with or without disability, may struggle with maintaining a healthy lifestyle.[1] Emotional well-being (eg, social connectedness through employment, social role within the household) might prevent or delay secondary conditions for which they are at increased risk compared with patients without disabilities (eg, depression, anxiety, chronic obstructive pulmonary disease, dementia, seizure).[30] Compared with people without a history of TBI, people with a history of mild, moderate, or severe TBI and who are receiving care have more physician visits, which provide an opportunity for lifestyle counseling.[30] Building connections between the healthcare community and public health professionals may help address the complex health, social, and economic needs of people living with a TBI.[31] Furthermore, public health interventions tailored to improve access to healthcare services, social connections, and employment need to be adapted and evaluated for people living with a TBI and disabilities in a specific functional domain or multiple domains.[31]

Limitations

There are several limitations to this study. First, because the data in the BRFSS are retrospective and cross-sectional, it is not possible to determine temporality and causality between lifetime history of TBI and living with a current disability. While sustaining a TBI of any severity increases the risk for disability, the reverse may also be true.[32] Longitudinal studies or direct measurement of TBI-related disability may further elucidate this relationship. Related, it was not possible to measure whether the reported disability was TBI-related. It is likely that many of the reported disabilities were not due to the TBI that was sustained. Second, BRFSS data are based on self-report and subject to recall bias. However, the data do provide results that can be used to inform larger, more robust studies about individuals with TBI and disability. Third, the BRFSS telephone survey might underestimate the prevalence of disability because it is conducted among noninstitutionalized adults and those with more severe disabilities may not answer the survey or may live in institutional settings or group homes. Fourth, there was a high percentage of missing data for the question on lifetime history of TBI (ie, 24% of

respondents did not answer the question, $N = 1116$). This was due to partial completion of the survey (ie, respondents who ended the interview before the TBI optional module). Furthermore, respondents who did not answer this question compared with those who did were different on all demographic characteristics (except for marital status), as well as the reported outcome disability variables. It is therefore possible that the findings from this study are not generalizable to those groups that were less likely to answer the TBI questions (eg, males and younger people), and it is also possible that the prevalence of disability is under- or overestimated. In addition, since the data are only from North Carolina, these findings are generalizable only to individuals in North Caroline and not to the larger BRFSS sample. Fifth, the inclusion of LOC in the lifetime TBI question likely biased toward more severe brain injuries by inquiring only about that single symptom. Studies suggest that only about 5.7% to 12%[33–35] of people who sustain a TBI lose consciousness. Thus, this study likely underestimates the prevalence of TBI in North Carolina, and the association between TBIs without LOC and disability may be different. Consequently, it is not possible to know whether these results are generalizable to those with potentially less severe forms of TBI. Moreover, some individuals may not recall whether they lost consciousness. This may be especially true among those who sustained a TBI many years ago or when they were a child and those who did not seek medical care.

CONCLUSION

This study demonstrates that there is a significant association between having a history of TBI and living with a current disability among residents in North Carolina, especially among veterans. In-depth retrospective studies on lifetime history of TBI and subsequent disability may be beneficial to explore this relationship further and inform the development of targeted interventions, such as those that improve mobility. Furthermore, broader use of evidence-based prevention strategies, such as those that mitigate falls among older adults and motor vehicle crash–related injuries, may help reduce the burden of this injury.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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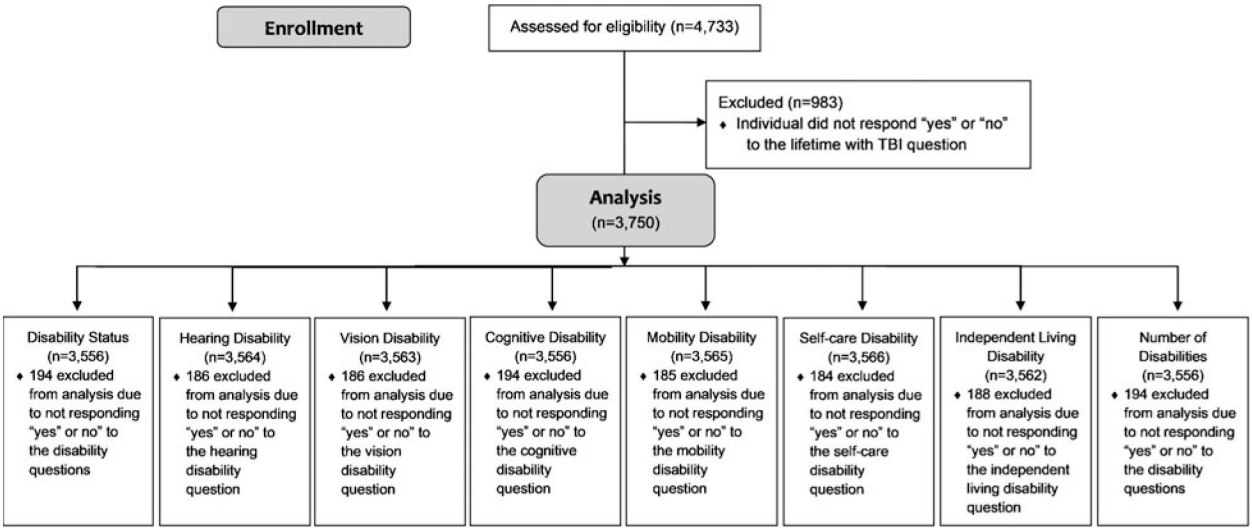

Figure 1.

STROBE diagram of the statistical analysis of the respondents from the 2018 North Carolina BRFSS. TBI indicates traumatic brain injury.

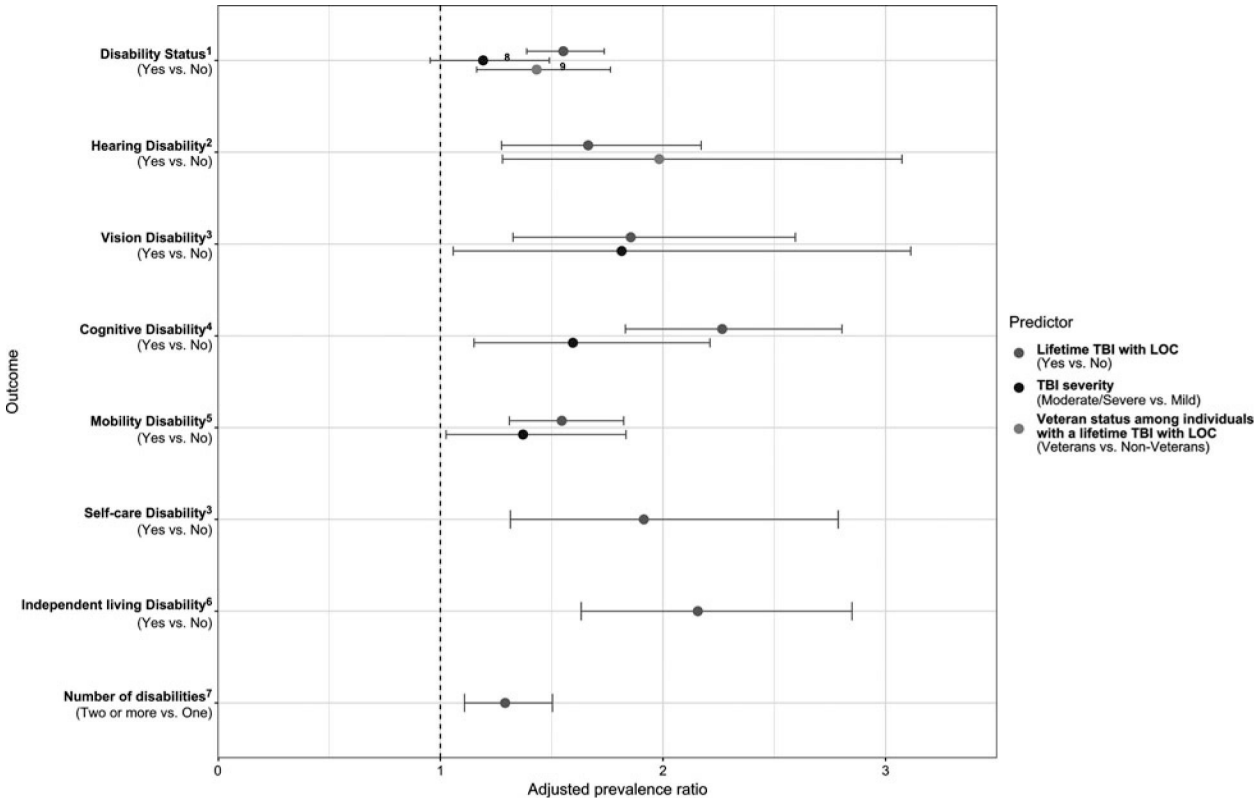

Figure 2.

Adjusted prevalence ratio and 95% CI for the relationship between history of traumatic brain injury with loss of consciousness and living with a current disability—North Carolina Behavioral Risk Factor Surveillance System, 2018. [a]Outcome adjusted for age, veteran status, marital status, education, employment, and federal poverty level. [b]Outcome adjusted for age, veteran status, education, and employment. [c]Outcome adjusted for age, marital status, education, employment, and federal poverty level. [d]Outcome adjusted for marital status, education, employment, and federal poverty level. [e]Outcome adjusted for sex, age, veteran status, marital status, education, employment, and federal poverty level. [f]Outcome adjusted for sex, age, marital status, education, employment, and federal poverty level. [g]Outcome adjusted for age, race/ethnicity, marital status, employment, and federal poverty level. [h]Outcome additionally adjusted for race/ethnicity due to the variable being a confounder that resulted in at least a 10% change of the parameter estimate. [i]Outcome additionally adjusted for sex due to the variable being a confounder that resulted in at least a 10% change of the parameter estimate. LOC indicates loss of consciousness; TBI, traumatic brain injury.

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TABLE 1

Demographic characteristics of adult respondents to the North Carolina Behavioral Risk Factor Surveillance System, 2018[a]

	Total (all residents, *N* = 3570)		Veterans (*N* = 486)		Nonveterans (*N* = 3083)			
Characteristic	***N***	**Weighted percentage**	***N***	**Weighted percentage**	***N***	**Weighted percentage**	**Test statistic**	***P***
Sex							237.3	<.0001
Male	1609	46.3	422	87.0	1186	41.2		
Female	1960	53.7	64	13.0	1896	58.8		
Age							7.6	<.0001
Mean	3519	49.7	482	57.6	3037	48.7		
Race/ethnicity							18.5	<.001
Non-Hispanic White	2401	67.2	351	68.8	2050	67.0		
Non-Hispanic Black	695	21.4	103	26.4	592	20.8		
Non-Hispanic Other[b]	154	4.1	15	3.5	139	4.2		
Hispanic	269	7.3	11	1.3	258	8.0		
Veteran status							…	…
Yes	486	11.2	…	…	…	…		
No	3083	88.8	…	…	…	…		
Marital status							43.5	<.0001
Married	1715	52.2	287	66.0	1428	50.4		
Divorced/widowed/separated	1067	22.2	149	23.7	918	22.0		
Never married	659	21.9	41	8.9	618	23.6		
A member of an unmarried couple	116	3.7	8	1.4	108	3.9		
Educational attainment							43.7	<.0001
Less than high school	412	14.5	20	4.1	392	15.8		
Completed high school	874	25.6	108	23.1	766	25.9		
Some college	1069	34.4	183	47.5	886	32.8		
Bachelor’s degree or higher	1208	25.5	175	25.3	1033	25.5		
Employment status							27.3	<.0001
Currently employed[c]	1754	55.2	160	41.6	1594	56.9		
Out of work	110	3.7	16	4.3	94	3.7		

Characteristic	Total (all residents, *N* = 3570)		Veterans (*N* = 486)		Nonveterans (*N* = 3083)		Test statistic	*P*
	N	Weighted percentage	*N*	Weighted percentage	*N*	Weighted percentage		
Unable to find work	361	9.4	38	8.3	323	9.5		
Homemaker/student/retired	1326	31.7	270	45.8	1056	29.9		
Federal poverty level[d]							32.4	<.0001
<100%	377	11.6	16	3.8	361	12.6		
≥100% to <200%	770	19.8	102	20.0	668	19.8		
≥200%	1732	48.8	292	60.9	1440	47.3		
Unknown	691	19.7	76	15.3	614	20.3		
Lifetime TBI with loss of consciousness							16.1	<.0001
Yes	911	24.8	171	34.7	740	23.6		
No	2659	75.2	315	65.3	2343	76.4		
TBI severity[e]							1.3	.25
Mild (<30-min LOC)	698	85.2	128	81.4	570	85.9		
Moderate/severe (≥30-min LOC)	138	14.8	32	18.6	106	14.1		
Age of onset of first TBI with LOC[f]							0.3	.75
Mean	854	21.5	160	21.9	694	21.5		
Disability status							16.0	<.0001
Yes	1197	31.1	214	41.6	983	29.8		
No	2359	68.9	271	58.4	2088	70.2		
Hearing disability							42.4	<.0001
Yes	356	8.8	100	19.1	256	7.5		
No	3208	91.2	386	80.9	2822	92.5		
Vision disability							3.0	.08
Yes	236	5.9	44	8.4	192	5.6		
No	3327	94.1	441	91.6	2886	94.4		
Cognitive disability							3.2	.07
Yes	448	13.0	72	16.8	376	12.5		
No	3108	87.0	408	83.2	2699	87.5		
Mobility disability							6.3	.01
Yes	694	16.8	117	21.9	577	16.1		

Characteristic	Total (all residents, *N* = 3570)		Veterans (*N* = 486)		Nonveterans (*N* = 3083)		Test statistic	*P*
	N	Weighted percentage	*N*	Weighted percentage	*N*	Weighted percentage		
No	2871	83.2	369	78.1	2501	83.9		
Self-care disability							1.2	.28
Yes	183	5.0	32	6.5	151	4.8		
No	3383	95.0	453	93.5	2929	95.2		
Independent living disability							0.4	.55
Yes	320	8.2	44	7.4	276	8.3		
No	3242	91.8	442	92.6	2799	91.7		
Number of disabilities[g]							0.3	.58
1	629	52.5	110	50.1	519	53.0		
≥2	568	47.5	104	49.9	464	47.0		

Abbreviations: LOC, loss of consciousness; TBI, traumatic brain injury.

[a]The sample includes only individuals those who responded to the lifetime TBI with LOC question (*N* = 3570).

[b]Includes those who answered that they were “non-Hispanic, Asian, American Indian and Alaska Native (AI/AN), or other.”

[c]Includes those who are self-employed.

[d]Poverty categories are based on the ratio of the respondent’s annual household income to the appropriate simplified 2017 federal poverty threshold (given family size: number of adults [1–14] in the household and number of children [≥0] in the household) defined by the US Census Bureau. This ratio is multiplied by 100 to be expressed as a percentage, and federal poverty thresholds were then used to categorize respondents into 4 FPL categories: (1) <100% of FPL, (2) ≥100% to <200% of FPL, (3) ≥200% of FPL, and (4) unknown.

[e]Total does not sum to 911 or 171 due to respondents who did not report the amount of time of LOC or refused to answer.

[f]Total does not sum to 911 or 171 due to respondents who did not know their age of first TBI or refused to answer.

[g]Includes those who reported at least 1 disability.