TABLE 1—Veteran Characteristics, Screening Disposition, and Living Situation: Philadelphia Veterans Affairs Medical Center, PA; October 1, 2012–January 10, 2013

Characteristic	Positive Screen, No. (%)		Negative Screen, No. (%)
	Housing Instability or Homeless	Homelessness Risk	
Total	12 754 (0.9)	17 211 (1.2)	1 368 302 (97.9)
Gender			
Female	1213 (1.1)	1980 (1.9)	104 127 (97.0)
Male	11 541 (0.9)	15 231 (1.2)	1 216 174 (97.9)
Age, y			
18–34	1663 (1.8)	2050 (2.2)	87 835 (95.9)
35–54	4660 (1.9)	6326 (2.5)	240 714 (95.6)
55–64	4467 (1.2)	6075 (1.6)	371 771 (97.2)
65–74	1452 (0.4)	2093 (0.6)	372 804 (99.1)
≥ 75	510 (0.2)	664 (0.2)	295 143 (99.6)
Living situation[a]			
House–with subsidy	325 (2.5)	1092 (6.3)	NA
House–no subsidy	2704 (21.2)	10 408 (60.5)	NA
With friend or family	4719 (37.0)	3612 (21.0)	NA
Motel or hotel	671 (5.3)	155 (0.9)	NA
Institution	484 (3.8)	127 (0.7)	NA
Shelter	737 (5.8)	58 (0.3)	NA
Street	1321 (10.4)	80 (0.5)	NA
Other situation	1649 (12.9)	1679 (9.8)	NA

Note. NA = not applicable. Row and column totals may not equal 100% because of missing data. The sample size was n = 1 398 925.
[a]Percentages for living situation are based on screening disposition (i.e., column percentages); living situation is only available for veterans who screened positive. Note that veterans are asked to report their living situation for most of the 2-mo period before date of screening; therefore, some contradiction may exist between their screening disposition and living situation (e.g., some veterans who reported housing instability also reported living in their own unsubsidized housing for the majority of the 2-month period).

targeting, and homelessness prevention interventions. Specifically, future work will focus on sociodemographic characteristics such as race, ethnicity, gender, and medical and behavioral health diagnoses and the implications for effective targeting of homelessness prevention resources. ■

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Challenges Associated With Screening for Traumatic Brain Injury Among US Veterans Seeking Homeless Services

Leah M. Russell, MA, Maria D. Devore, MS, Sean M. Barnes, PhD, Jeri E. Forster, PhD, Trisha A. Hostetter, MPH, Ann Elizabeth Montgomery, PhD, Roger Casey, PhD, LCSW, Vincent Kane, MSS, and Lisa A. Brenner, PhD

We identified the prevalence of traumatic brain injury (TBI) among homeless veterans and assessed the TBI–4, a screening tool created to identify TBI history. Between May 2010 and October 2011, 800 US veterans from 2 hospitals, one eastern (n = 122) and one western (n = 678) completed some or all measures. Findings suggested that 47% of veterans seeking homeless services had a probable history of TBI (data for prevalence obtained only at the western hospital). However, psychometric results from the screening measure suggested that this may be an underestimate and supported comprehensive assessment of TBI in this population. (*Am J Public Health.* 2013;103:S211–S213. doi:10.2105/AJPH.2013.301485)

Eradicating homelessness and assessing and treating traumatic brain injury (TBI) are key areas of focus for the US Department of Veterans Affairs (VA).[1,2] Research from Canada has suggested that 53% of homeless

TABLE 1—Positive Responses for Each TBI-4 Question: 1 Western and 1 Eastern US Metropolitan Veterans Affairs Hospital, May 2010-October 2011

Question	(1) Have you ever been hospitalized or treated in an emergency room following a head or neck injury?	(2) Have you ever been knocked out or unconscious following an accident or injury?	(3) Have you ever injured your head or neck in a car accident or from some other moving vehicle accident?	(4) Have you ever injured your head or neck in a fight or a fall?	Any 1 of 4
Positive response	249	317	216	251	400
Percentage positive (95% CI)	37 (33, 40)	47 (43, 51)	32 (28, 36)	37 (33, 41)	59 (55, 63)

Note. CI = confidence interval; TBI-4 = traumatic brain injury-4. The sample size was n = 678.

individuals have a history of TBI, yet the prevalence of TBI among homeless veterans is unknown.[3] Additionally, TBI screening measures for homeless veterans have yet to be validated. We aimed to determine the prevalence of TBI among veterans seeking homeless services, such as those provided by the Grant and Per Diem[4] and the US Department of Housing and Urban Development's VA Supportive Housing Programs,[5] and hypothesized that the proportion of probable TBI in this group would be significantly higher than that found among homeless civilians (53%).[3] Additionally, we evaluated the utility of a TBI screening tool (TBI–4)[6] and hypothesized that the sensitivity and specificity of the TBI–4 compared with a gold-standard Ohio State University Traumatic Brain Injury–Identification Method (OSU TBI–ID)[7] would be significantly greater than 0.75 and 0.80, respectively.

METHODS

We obtained data used to determine prevalence from 678 veterans at a western metropolitan VA hospital at which TBI–4 data were collected as part of standard procedures to obtain homeless services. The mean age at assessment was 51.9 years (SD = 9.8), and 642 (94.7%) were men.

Data used for analysis of criterion-related classification accuracy of the TBI–4 relative to the OSU TBI–ID were from 313 veterans who completed study measures. This cohort included 191 veterans from the same western VA hospital and 122 veterans from an eastern metropolitan VA hospital. The mean age at assessment was 52.2 years (SD = 8.6), and 302 (96.5%) were men.

Measures

The TBI–4[6] is a 4-question brief screen for TBI history that was created for inclusion in a VA hospital's mental health intake form. For our analyses, responses were coded in 2 ways. First, we coded a positive response to question 2 as a positive screen for probable TBI (Table 1). This question is most similar to that used in past prevalence research[3,8] and queries for an injury event with an associated loss of consciousness. Second, we coded a positive response to any of the 4 questions as a positive screen for possible TBI. The distinction between positive screens for probable versus possible TBI is necessary because positive responses to questions 1, 3, or 4 may indicate a history of injury without TBI. The OSU TBI–ID[7] is a psychometrically sound structured clinical interview designed to elicit reports of TBI occurring over a person's lifetime.

Procedures

At the western VA hospital, TBI–4 responses and demographic information for all veterans presenting for homeless services were gleaned via chart review. Of these veterans, 191 consented to complete additional study measures. At the eastern VA hospital, 122 veterans presenting for homeless services consented to complete the study measures, including the TBI–4; their demographic information was retrieved by chart review.

RESULTS

For the 678 veterans whose TBI–4 responses were collected at homeless intake evaluations, the prevalence of probable TBI, measured by question 2 of the TBI–4, was 47%.

This prevalence was significantly lower than hypothesized, with $t(677) = -3.26$; $P = .001$; and 95% confidence interval (CI) = 43%, 51%. The prevalence of possible TBI among veterans seeking homeless services was 59%, significantly higher than 53%, with $t(677) = 3.17$; $P = .002$; 95% CI = 55%, 63% (Table 1).

Using the OSU TBI–ID as the gold standard and a positive response to any question on the TBI–4 as the criterion for a possible TBI, sensitivity was 220 of 285, or 0.77 (97.5% CI = 0.71, 0.83) and specificity was 23 of 28, or 0.82 (97.5% CI = 0.60, 0.95). When using

TABLE 2—Criterion Validity of the TBI-4

	Yes to Any TBI-4 Question Is Considered Positive for TBI			Yes to TBI-4 Question 2 Is Considered Positive for TBI		
TBI-4	Positive OSU, No.	Negative OSU, No.	Total No.	Positive OSU, No.	Negative OSU, No.	Total No.
Positive	220	5	225	181	1	182
Negative	65	23	88	104	27	131
Total	285	28	313	285	28	313

Note. OSU = Ohio State University TBI Identification Method; TBI-4 = Traumatic Brain Injury–4.

a positive response to question 2 as the criterion for probable TBI, sensitivity was 181 of 285, or 0.64 (97.5% CI = 0.57, 0.70) and specificity was 27 of 28, or 0.96 (97.5% CI = 0.79, 1.00; Table 2). The sensitivity and specificity of the TBI–4, on the basis of both possible and probable screens, was not significantly greater than the targeted values. Question 2 of the TBI–4 did not identify 36% of veterans who actually had a history of TBI on the basis of the gold-standard measure.

DISCUSSION

Nearly half of the veterans seeking homeless services at a western metropolitan VA reported a past injury resulting in loss of consciousness. A TBI prevalence of 47% is markedly high when compared with 12% reported in the general population.[9] Although these results, in combination with past research on the negative sequelae associated with TBI,[10–12] clearly indicate that TBI is a significant health concern for homeless veterans, they do not initially appear to support the hypothesis that homeless veterans have a significantly higher prevalence of TBI than homeless civilians. However, because of the limited sensitivity and specificity of the TBI–4, the data obtained likely underestimated the true prevalence of TBI in this VA homeless population. Findings support comprehensive TBI assessment such as the OSU TBI–ID, as opposed to screening, for all veterans seeking homeless services. ■

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L. M. Russell and M. D. Devore collected data, assisted with analysis and interpretation of the data, and led the writing of the article. S. M. Barnes assisted with interpretation of the data and writing the article. J. E. Forster and T. A. Hostetter performed data analysis for the article. A. E. Montgomery, R. Casey, and V. Kane contributed substantially to conception and design of this research. L. A. Brenner contributed to conceptualization, design, interpretation, supervision, and writing of the article.

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Human Participant Protection

Both VA hospitals received local institutional review board approval to obtain informed consent from human participants. Additionally, one site was issued a waiver of consent to access electronic medical records.

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Housing Instability and Mental Distress Among US Veterans

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Evidence has suggested increased risk for homelessness and suicide among US veterans, but little is known about the associations between housing instability and psychological distress (including suicidal ideation). We examined frequent mental distress (FMD) and suicidal ideation among a probability-based sample of 1767 Nebraska veterans who participated in the 2010 Behavioral Risk Factor Surveillance Survey who had and had not experienced housing instability in the past 12 months. Veterans experiencing housing instability had increased odds of FMD and suicidal ideation. (*Am J Public Health.* 2013; 103:S213–S216. doi:10.2105/AJPH.2013.301277)

Veterans are disproportionally overrepresented in the homeless population, accounting for 14% of all adults experiencing homelessness.[1] On any given night, more than 67 000 US veterans are homeless.[1] Housing is considered a basic human need, and housing-related stress can have stark ramifications for physical and mental health, including mental distress and suicidal ideation. Previous studies have reported associations between suicidal ideation and homelessness[2,3] and housing instability and depression.[4] Schinka et al.[5]