The Hawaii Vietnam Veterans Project: Is Minority Status a Risk Factor for Posttraumatic Stress Disorder?

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Abstract: The Hawaii Vietnam Veterans Project (HVVP) was congressionally mandated as a follow-up to the National Vietnam Veterans Readjustment Study (NVVRS) to assess current and lifetime prevalence of posttraumatic stress disorder (PTSD). The Hawaii Vietnam Veterans Project used the original two-stage NVVRS design in which a lay interview, conducted with a large sample, was followed by a clinical interview with a smaller subsample. Reported results are from the clinical subsample consisting of 100 Native Hawaiian and 102 American of Japanese ancestry veterans compared with white veterans from the NVVRS cohort. The major finding is that veterans of Japanese ancestry exhibited significantly lower prevalence of current full, current partial, and lifetime full PTSD than white veterans. Adjustment for age and war zone exposure did not eliminate most of these differences. These results indicate that minority status per se is not a risk factor for PTSD.

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Epidemiological studies have generally shown that individuals with ethnic minority status are at greater risk than Caucasians who have been exposed to the same events to develop posttraumatic stress disorder (PTSD) and other psychological problems. A comprehensive review of the empirical literature on postdisaster sequelae found that adults and children of minority group status were generally more likely to develop PTSD and other psychological problems than Caucasians exposed to the same disaster (Brewin et al., 2000; Norris et al., 2002).

In a series of epidemiological surveys on the prevalence of PTSD among American veterans of the Vietnam War, the National Vietnam Veterans Readjustment Study (NVVRS), black, Hispanic, and white veterans were compared (Kulka et al., 1990; Schlenger et al., 1992). In the American Indian Vietnam Veterans Project (AIVVP), American Indian veterans from two separate tribes were compared with the three NVVRS cohorts (Beals et al., 2002). In both studies, the current and lifetime prevalence of PTSD was significantly lower among white veterans than among veterans from each of the four ethnic minority groups.

Another finding from both NVVRS and AIVVP was that ethnic minority veterans were more likely than white veterans to have been exposed to more combat, violence, atrocities, deprivation, and adverse environmental factors (Beals et al., 2002; Kulka et al., 1990). Using multivariate analysis, Beals et al. (2002) found that the effect of ethnicity on likelihood of PTSD became nonsignificant when warzone exposure was taken into account, which suggests that the higher likelihood of PTSD among minority veterans is due at least in part to their greater likelihood of war zone exposure and not to their minority status.

The Hawaii Vietnam Veterans Project (HVVP) was designed specifically to address the same questions as NVVRS and to determine whether the principal NVVRS and AIVVP findings also applied to Native Hawaiian and American of Japanese ancestry Vietnam veterans.

There was reason to predict that HVVP would replicate aforementioned findings showing that minority status was associated with both higher war zone exposure and higher PTSD prevalence. In addition to war-related stressors, Asian-Pacific Islanders were also exposed to significant racism during their military service (Abueg and Chun, 1996; Hamada et al., 1988). Indeed, Loo and associates (2001) have shown that such racism contributes to PTSD severity and

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generalized psychiatric distress among Asian-Pacific Islander Vietnam veterans.

There was also reason to suspect that Hawaiian and Japanese veterans might differ. The only published study with a direct bearing on HVVP found wide differences in PTSD prevalence among 44 Asian-Pacific Islander Vietnam veterans: 0% in Americans of Japanese ancestry, 13% in Chinese Americans, 29% in Native Hawaiians, and 40% in a mixed group of Korean, Filipino, and Samoan veterans (Matsuoka and Hamada, 1991/1992).

Another reason to question whether PTSD prevalence would be higher among Americans of Japanese ancestry is a consistent finding of lower psychiatric morbidity among this ethnic group with respect to depression, anxiety, and alcoholism although PTSD prevalence has not been studied. Briefly summarized, Americans of Japanese ancestry have consistently exhibited disproportionately low rates of psychiatric disorders, cultural traditions against expression of emotional reactions or psychological distress in public, and shame and stigmatization associated with mental disorders (Iwamasa et al., 1998; Uomto and Gorsach, 1984; U.S. Department of Health and Human Services, 2001). The impact of such cultural pressures in the present study might have minimized the acknowledgment or expression of PTSD symptoms among veterans of Japanese ancestry, thereby resulting in significantly lower prevalence of PTSD within this cohort.

In contrast with Americans of Japanese ancestry, Native Hawaiian veterans might be expected to exhibit a relatively high prevalence of PTSD. Native Hawaiians have faced and are currently facing serious cultural disintegration pressures since the advent of American and Asian influences that have deleted the indigenous population of its traditions, customs, values, and produced a breakdown of social, economic, religious, and political systems (Crabbe, 1998). Such adverse sociocultural transformations have had profound effects on mental health. Native Hawaiians rank among the highest groups in Hawaii for virtually every index of personal maladjustment, including crime, family violence, alcohol and substance abuse, suicidal youth, depression, and social maladjustment (Mokuau et al., 1998; U.S. Department of Health and Human Services, 2001).

As mandated by Congress, HVVP emulated the original two-stage NVVRS design in which a lay interview was conducted with a large sample and then a clinical interview was conducted with a smaller subsample. The Hawaii Vietnam Veterans Project did not include the two comparison groups surveyed in NVVRS: Vietnam-era veterans (who saw military service outside of Southeast Asia during the Vietnam War) and age-matched nonveteran civilians. Practical constraints prevented the inclusion of these comparison groups but permitted a design more focused on the relationship between combat service and the prevalence of PTSD. Thus, HVVP resembled NVVRS closely with respect to overall design, instrumentation, and objectives. The major differences between the two studies were the omission of comparison groups and an additional 8 years between the end of military service in Vietnam and the survey of combatants.

This report focuses primarily on results from the HVVP clinical interview, comparing them with the findings from the NVVRS clinical subsample. More extensive details can be found elsewhere for NVVRS (Kulka et al., 1990; Schlenger et al., 1992) and HVVP (National Center for PTSD and National Center for American Indian and Alaska Native Mental Health Research [NCPTSD and NCAIANMHR], 1997). Posttraumatic stress disorder prevalence was computed by analyses in which whites served as the reference group against which all other groups are compared. This is completely consistent with the focus of both NVVRS and AIVVP studies in which the major findings concern differences between whites and each minority group. With regard to war zone exposure, other military variables, and PTSD symptom severity, on the other hand, we have chosen to compare each minority group with each other. This is because we believe that restricting all analyses exclusively to differences between each minority group and whites would not do justice to the richness of this data. With this strategy, we were able to test for differences between Native Hawaiians and Americans of Japanese ancestry and to compare these two groups with each group within the NVVRS cohort.

Thus, the specific aim of HVVP was to assess current and lifetime prevalence of full and partial PTSD among Vietnam veterans who were either Native Hawaiian or Americans of Japanese ancestry and to compare such findings with those previously reported from NVVRS for white, black and Hispanic Vietnam veterans.

METHODS

Participants

Sampling

The Hawaii Vietnam Veterans Project was restricted to male Native Hawaiian and American of Japanese ancestry veterans who had served in the Vietnam theater and who resided in the State of Hawaii at the time of the study. As in NVVRS, the primary sources for the identification of veterans and the applicable sample were the military records maintained by the National Personnel Record Center (NPRC) and the Defense Manpower Data Center. It was a significantly smaller data set than NPRC. Two sampling frames were constructed from these two data sources containing listings of veterans with Social Security Numbers having a prefix of 575 or 576 that are assigned exclusively to Hawaii. The sampling plan involved drawing sequential random selections from the two sampling frames at differing rates, given the variation in the size of the two frames according to a weighting scheme that was developed (described in

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NCPTSD and NCAIANMHR, 1997). Selected veterans were screened to eliminate those veterans who were not eligible for the study because of either nonresidence in Hawaii or military service outside of the Vietnam Theater. If eligible, the veteran was contacted by a project staff member, also a veteran, to positively identify the sampled veteran; to determine his residence; to establish his self-reported ethnicity; the location and period of his military service; and to obtain his informed consent to participate in the study. The prelocating and locating processes identified 3,681 veterans, of whom 700 met the study admission criteria; 346 Americans of Japanese ancestry and 354 Native Hawaiians.

Lay Interview Participants

Among the 354 Native Hawaiians eligible for inclusion in HVVP, 302 completed the lay interview, 23 consented to participate but were unable to complete the interview, and 29 refused to be interviewed. Among the 346 Americans of Japanese ancestry eligible for HVVP, 302 completed the lay interview, 32 consented to participate but were unable to complete the interview, and 12 refused to be interviewed. Incomplete interviews were due primarily to veterans' intensive negative emotional reactions while recounting war experiences or extreme distress while describing their PTSD symptoms that were of sufficient magnitude to prompt the interviewer to stop the procedure as directed.

Because discharge information (military record DD-214) information was available on all veterans sampled, it was possible to compare lay interview respondents to those who either declined or were unable to be interviewed. There were no significant differences between respondents and nonrespondents on combat exposure factors concerning service in Vietnam. However, the respondent group contained more retirees than the nonrespondent group—they were older, entered active duty earlier, were less likely to have been drafted, had more months on active duty, and were discharged later and at higher pay grades.

Clinical Interview Participants

As in NVVRS, the HVVP included a clinical interview of a subsample of lay interview participants. For the clinical study, respondents who had previously participated in the lay interview were stratified on the basis of scores obtained on the Mississippi Scale for Combat-Related PTSD (M-PTSD). To replicate NVVRS procedures the distribution of M-PTSD scores was divided into thirds: (1) scores of 89 or above where the likelihood of PTSD is high, (2) at 71 or below where PTSD is unlikely, and (3) for all scores in between. Our intention was to select all likely PTSD cases, a sample of non-PTSD cases, and a sufficient number of uncertain PTSD cases to identify false negatives. A total of 131 Native Hawaiian and 131 Americans of Japanese ancestry veterans were selected for the clinical subsample, of which 78% (100 Native Hawaiian and 102 Americans of Japanese ancestry) veterans completed the interview. The M-PTSD score distribution varied somewhat between the two ethnic groups so that the percentage of Native Hawaiians with M-PTSD scores $\geq$ 89 was 50% whereas it was only 20.6% for Veterans of Japanese ancestry. Overall, 69% Native Hawaiian and 79% Americans of Japanese ancestry selected veterans completed the clinical interview.

Measures

The challenge of measurement was to develop instruments for HVVP that were both comparable to scales used in NVVRS and that were culturally sensitive. This was a very labor-intensive activity involving focus groups and pilot testing to revise NVVRS instruments to include culturally understandable instructions, items, prompts, and interpretations for the items. Details are provided elsewhere (NCPTSD and NCAIANMHR, 1997). The Composite International Diagnostic Interview (CIDI) was used for the lay interview instead of the Diagnostic Interview Schedule (DIS) that was used in NVVRS because it had been widely tested, had known reliability and validity, was designed specifically for cross-cultural use, and had already undergone several successful field trials around the world (Robins et al., 1991).

Lay Interview

After this extensive instrument modification procedure, the lay interview questionnaire was finalized. It consisted of 15 sections that paralleled the original NVVRS instrument as much as possible. Sections pertinent to this report inquired about marital history and adjustment; educational history; occupational history and work role adjustment; military service history; Vietnam experience; postservice history; and the CIDI, as noted above.

The PTSD scales incorporated into the Lay Interview Questionnaire (also used in NVVRS) were the Mississippi Scale for Combat-Related PTSD (M-PTSD; Keane et al., 1988) and the PTSD subscale from the MMPI (Keane et al., 1984). The M-PTSD is a 35-item self-report instrument developed for combat veterans that in addition to Criterion B, C, and D symptoms taps associated symptoms such as guilt and suicidality. The M-PTSD has performed well in research and clinical settings. The PTSD subscale from the MMPI (Keane et al., 1984) is a 49-item self-report instrument that has performed well with combat veterans.

War Zone Exposure

War zone exposure was operationalized using the four components identified by King et al. (1995) using structural equation modeling: traditional combat, atrocities-abusive violence, perceived threat, and malevolent environment. King et al. reported excellent internal consistencies for all four components (.94, .88, .83, and .91, respectively). The combat

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component attempted to assess the extent of routine combat experiences and was composed of 36 items. The perceived threat component focused on the respondent's subjective assessment of his combat experiences; it was composed of nine items, *e.g.*, "How often were you in a combat situation in which you thought you would never survive?" The atrocities and abusive violence component measured the number of extreme combat experiences and was composed of nine items, *e.g.*, "To what extent were you involved in terrorizing and killing civilians?" The harsh and malevolent environment component was composed of 18 items that inquired about unpleasant aspects of war zone service such as insects, disease, and filth; lack of privacy; bad food; and bad climate. Each component score was then standardized to have a mean of "0" and a standard deviation of 1 and the revised war zone variable was calculated as the mean of these standardized scores.

PTSD Diagnosis

The primary instrument used in the clinical interview was the Structured Clinical Interview for DSM-III-R (SCID; Spitzer et al., 1987). The National Vietnam Veterans Readjustment Study used a complex composite PTSD diagnosis that was based on the SCID, M-PTSD, and MMPI and an adjudication process when there were apparent inconsistencies between results from SCID, M-PTSD, and MMPI. At such times, NVVRS experts discussed each case until a consensus could be achieved concerning current PTSD or current partial PTSD. Lifetime full and partial PTSD diagnoses were based entirely on the SCID.

In HVVP, firm decision rules were established for all diagnoses. Therefore, there was no need for an adjudication process. These rules are conservative. They are completely within the spirit of the NVVRS composite diagnosis but, we believe, have less ambiguity and more face validity than that of the complicated composite and adjudication diagnostic procedure employed in NVVRS (Schlenger et al., 1992; Weiss et al., 1992). Current PTSD diagnostic criteria could be met in one of two ways: (1) SCID criteria for current PTSD were met; or (2) current partial PTSD criteria were met (see below) and both the M-PTSD was ≥ 89 and the MMPI was ≥ 13. Lifetime PTSD was diagnosed when subjects either met SCID criteria or when they met criteria for current PTSD as described above. Partial (current or lifetime) PTSD was diagnosed when the following SCID criteria were met: (1) Meet Criterion A, endorse at least 1 B symptom, at least 2 D symptoms, and meet Criterion E; or (2) meet Criterion A, endorse at least 1 B symptom, at least 1 C symptom, at least 1 D symptom, and meet Criterion E.

Procedure

Lay Interview Process

Field offices were established on each of the six major Hawaiian Islands (Oahu, Hawaii, Maui, Molokai, Kauai, and Lanai). Twenty-six veterans who (with one exception) were Native Hawaiian or American of Japanese ancestry located the identified individuals. All interviews were audiotaped. A 10% sample of all completed interviews was selected for further validation. All questionnaire items on the paper copy and the audiotape of the same interview were reviewed simultaneously to detect inconsistencies between the paper and audio copies of the interview and, when necessary, to make corrections by contacting the respondent a second time.

Clinical Interview Process

The clinical interview staff consisted of 12 doctoral-level clinicians, the majority of whom were clinical psychologists who represented a mix of ethnicities including Americans of Japanese ancestry and Native Hawaiians. All clinical interviewers participated in an intensive 4-day training. They were required to achieve an interrater reliability kappa level of .80 in comparison with an expert panel before they were permitted to interview HVVP participants. All interviews were audiotaped. Interviews ranged from approximately 1 to 4 hours with an average length of 2 and one-half hours. The shorter interviews were with veterans who had few or no symptoms. Independent assessment monitors who were based in the HVVP office then reviewed all audiotapes. When there was disagreement on SCID ratings of any item, the HVVP project coordinator would confer with both the assessment monitor and clinical interviewer so that a consensus decision could be achieved with regard to the presence or absence of full or partial PTSD.

Data Analysis

Analysis was done using SUDAAN (Shah et al., 1995). SUDAAN uses design criteria in the analyses so that each sampling unit is weighted according to the sampling strategy as well as the level of nonresponse. This allows us to generalize the results beyond the samples on which the analyses were done. The clinical weights, when applied to the HVVP clinical sample, extend our results to the predefined study population of HVVP. However, the same is not true for the NVVRS. The clinical weights in NVVRS enable us to generalize the results to the subset that was eligible for selection for the clinical sample—approximately 42% of the study population. This was the population that was eligible for the clinical sample in that study, based on geographical distance from the interviewers.

We used DESCRIPT and CROSSTAB procedures to estimate means and percentages for the variables (Tables 1 and 2). Prevalence rates for the outcomes (current and lifetime PTSD, partial current and lifetime PTSD, and chronicity) were also calculated using DESCRIPT procedure.

For outcomes with multiple response categories, we fit the appropriate regression model using MULTILOG procedure. We used multinominal logistic regression (Agresti,

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TABLE 1. Comparison of War Zone Exposure and PTSD Symptom Severity Scale Scores for HVVP and NVVRS Clinical Subsamples, by Ethnic Group Membership[1]

	Ethnic Group									
	White (N = 101)		Black (N = 73)		Hispanic (N = 85)		Native Hawaiian (N = 100)		AJA[2] (N = 102)	
Characteristic	M	SE	M	SE	M	SE	M	SE	M	SE
War zone stress exposure scale[3]										
Total	-0.22_{b}	0.07	0.35_{c}	0.08	$0.01_{b,c}$	0.15	$-0.17_{a,b}$	0.15	-0.52_{a}	0.05
Combat	-0.23_{b}	0.10	0.38_{c}	0.10	$-0.06_{b,c}$	0.16	-0.17_{a-c}	0.21	-0.72_{a}	0.06
Atrocity exposure	$-0.11_{a,c}$	0.06	0.23_{b}	0.08	$0.12_{b,c}$	0.14	0.09_{a-c}	0.18	-0.27_{a}	0.05
Malevolent environment	$-0.25_{a,c}$	0.09	0.48_{b}	0.12	$0.01_{b,c}$	0.16	$-0.40_{a,c}$	0.13	-0.49_{a}	0.10
Perceived threat	$-0.30_{a,c}$	0.09	0.32_{b}	0.11	$-0.07_{b,c}$	0.16	$-0.21_{a,c}$	0.15	-0.59_{a}	0.07
Wounded or injured in Vietnam	$28.1\%_{b}$	5.3	$27.4\%_{b}$	5.8	$27.0\%_{b}$	6.3	$25.7\%_{b}$	9.1	$11.7\%_{a}$	3.8
PTSD Measures										
MMPI[4]	6.2_{a}	0.7	$10.8_{b,c}$	1.4	12.8_{b}	1.2	$7.8_{a,c}$	1.5	5.5_{a}	0.6
M-PTSD[5]	70.1_{a}	1.9	79.5_{b}	2.9	80.0_{b}	3.1	77.3_{b}	1.4	67.5_{a}	1.1

[1]Row means that these do not share a common subscript; they differ significantly from one another, $p < .01$.
[2]Americans of Japanese Ancestry.
[3]Each war zone exposure component score was standardized to have a mean of 0 and a standard deviation of 1.
[4]Minnesota Multiphasic Personality Inventory.
[5]Mississippi Scale for Combat-Related PTSD.

1990) for nominal and cumulative logistic regression (McCullagh, 1980) for ordinal outcomes. We used contrasts to compare the sets of regression coefficients (Table 1), *e.g.*, the contrast for marital status (never married, married, divorced) was a comparison of the percentages in the three outcome categories for any two ethnic groups using a χ^2 test with up to two degrees of freedom.

We wanted to examine the effect of ethnicity on outcome after adjustment for age at interview and warzone exposure. Age at interview was a continuous variable ranging from 32 to 70. For each of the outcome variables, we fitted three logistic regressions using RLOGIST. The first model used only ethnicity (coded as four dummy variables with white as the reference group). The second model added age at interview, and the third added war zone exposure. The weighted odds ratios and their corresponding 95% confidence intervals were then calculated.

The commentary and tables to follow present findings from the HVVP clinical subsample juxtaposed with comparable results from the NVVRS clinical subsample. All reported findings from NVVRS are based on new analyses carried out on the combined HVVP/NVVRS data set as described in Methods. Although statistical comparisons between the three NVVRS cohorts (Hispanic, black, and white) are displayed in the tables, we do not comment on within-NVVRS comparisons because they have been presented previously (Schlenger et al., 1992). Instead, we focus on pertinent contrasts between HVVP and NVVRS cohorts as well as significant contrasts within HVVP between Native Hawaiian and Americans of Japanese ancestry veterans. All contrasts considered significant are at $p < 0.01$.

RESULTS

Because the NVVRS and HVVP were conducted approximately 8 years apart, there were age differences between the two cohorts. The mean age (± SE) of Native Hawaiian and Americans of Japanese ancestry was 48.6 (± 0.5) and 49.6 (± 0.4), respectively. In comparison, the ages at which each group within the NVVRS cohort was surveyed were: white 41.3 (± 0.5), black 41.8 (± 0.7), and Hispanic 39.1 (± 0.2). All age differences between HVVP versus NVVRS groups were significant (all $ps < .01$). The HVVP and NVVRS groups did not differ with respect to marital status, size of household, time spent in a military hospital, having a military service-related disability, lifetime contact with VA treatment facilities, or membership in veterans' organizations. There were no differences regarding current occupational status except that Native Hawaiians were more likely than other groups to have been retired at the time they were studied. Veterans of Japanese ancestry were more likely than Hispanic or black veterans to have a college or graduate degree.

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TABLE 2. PTSD Prevalence and Weighted Odds Ratios for PTSD as a Function of Ethnic Group in Vietnam Veterans

	Ethnic Group				
Outcome	**White (N = 101)**	**Black (N = 73)**	**Hispanic (N = 85)**	**Native Hawaiian (N = 100)**	**AJA[1] (N = 102)**
Current PTSD					
Prevalence (SE)	11.8% (3.2)	19.9% (4.7)	27.0% (4.8)	11.8% (3.2)	1.9% (1.4)
Odds Ratio[2]					
Unadjusted	1.00	1.86 (0.87–3.96)	2.76* (1.25–6.11)	1.00 (0.51–1.97)	0.15* (0.05–0.46)
Age adjusted	1.00	1.90 (0.88–4.12)	2.52* (1.13–5.65)	1.52 (0.69–3.34)	0.23* (0.07–0.80)
Age and war zone	1.00	0.57 (0.22–1.47)	1.89 (0.78–4.61)	0.74 (0.21–2.64)	0.20* (0.05–0.84)
Lifetime PTSD					
Prevalence (SE)	22.4% (4.2)	36.2% (5.6)	34.6% (5.2)	38.7% (4.9)	8.8% (2.8)
Odds Ratio[2]					
Unadjusted	1.00	1.97 (0.96–4.02)	1.83 (0.85–3.93)	2.19 (0.80–5.96)	0.33* (0.17–0.65)
Age adjusted	1.00	2.02 (0.97–4.20)	1.69 (0.77–3.71)	3.07 (0.97–9.75)	0.47 (0.19–1.17)
Age and war zone	1.00	0.79 (0.35–1.79)	1.24 (0.53–2.91)	2.78 (0.39–20.07)	0.53 (0.18–1.54)
Current Partial PTSD					
Prevalence (SE)	4.6% (2.1)	4.3% (2.4)	5.7% (2.5)	11.2% (3.2)	1.0% (1.0)
Odds Ratio[2]					
Unadjusted	1.00	0.92 (0.24–3.56)	1.26 (0.36–4.43)	2.60 (0.40–17.02)	0.21* (0.04–0.97)
Age adjusted	1.00	0.87 (0.21–3.58)	1.60 (0.43–6.02)	1.47 (0.17–12.87)	0.07* (0.01–0.78)
Age and war zone	1.00	0.54 (0.12–2.43)	1.26 (0.30–5.23)	1.06 (0.12–9.26)	0.08* (0.01–0.84)
Lifetime Partial PTSD					
Prevalence (SE)	9.5% (2.9)	13.5% (4.0)	12.5% (3.6)	18.1% (3.9)	7.1% (2.5)
Odds Ratio[2]					
Unadjusted	1.00	1.50 (0.56–4.04)	1.37 (0.50–3.73)	2.12 (0.54–8.42)	0.73 (0.25–2.16)
Age adjusted	1.00	1.52 (0.57–4.05)	1.30 (0.46–3.72)	2.58 (0.57–11.64)	0.89 (0.24–3.28)
Age and war zone	1.00	1.00 (0.33–3.07)	1.08 (0.36–3.30)	2.25 (0.54–9.27)	0.99 (0.25–4.02)

[1]American of Japanese Ancestry.
[2]Confidence intervals for Odds Ratios (95%) appear in parentheses.
*$p < .05$.

War Zone Exposure and PTSD Symptom Severity

Table 1 shows war zone exposure as a total score and broken out by its four components: combat exposure, exposure to atrocities and violence, deprivation, and prisoner of war. Black veterans had the highest scores in all categories. Veterans of Japanese ancestry had the lowest scores in all categories and differed significantly from both black and Hispanic veterans on total exposure and on all subscales, as shown in Table 1. Such marked differences were not evident for Native Hawaiian veterans, whose total warzone stress exposure as well as exposure to malevolent environment and perceived threat were significantly less severe than black veterans but whose war zone exposure was generally comparable to the NVVRS and American of Japanese ancestry cohorts in other respects.

We also compared HVVP and NVVRS participants on other combat variables associated with PTSD in NVVRS. The following differences were significant at $p < 0.01$ utilizing multinominal or cumulative logistic regression analysis, as described in Methods. Veterans of Japanese ancestry were less likely than either Hispanic or black veterans to have been Marines and were less likely to have been injured in Vietnam than white veterans. Native Hawaiian veterans served the longest (significantly longer than white and Hispanic veterans), were more likely to have had multiple tours in Vietnam than Hispanic or black veterans, and were less likely to serve as Marines than Hispanic veterans.

Table 1 also shows that Americans of Japanese ancestry had significantly lower MMPI and M-PTSD scores than Hispanic and black veterans and lower M-PTSD scores than Native Hawaiians. Native Hawaiian veterans had higher M-PTSD scores than white veterans.

PTSD Prevalence

As shown in Table 2, the unadjusted prevalence of PTSD for each ethnic minority group is compared with that

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,for whites. The unadjusted odds ratios for current PTSD were significantly lower among Americans of Japanese ancestry and significantly higher among Hispanic veterans. A similar pattern was seen for lifetime and current partial PTSD, where the unadjusted odds ratios for Americans of Japanese ancestry were again significantly lower than for whites.

Given significant differences in age and war zone exposure, we examined how much these factors influenced the odds ratios. In NVVRS, differences in PTSD prevalence between white, black, and Hispanic veterans were either eliminated or narrowed after adjustment for war zone exposure. This is partially replicated in Table 2 where the unadjusted odds ratio for current PTSD among Hispanic veterans is no longer significant after adjustment for war zone exposure.

Different findings are found with both HVVP cohorts. For veterans of Japanese ancestry, adjustment for war zone exposure did not affect the significance of odds ratios as it did with NVVRS cohorts. Instead two patterns emerged. Either adjustment for age alone eliminated a significant difference in the unadjusted odds ratio (*e.g.*, in lifetime PTSD) or adjustment for both age and war zone exposure made no difference. Indeed, unadjusted odds ratios for current and current partial PTSD remained significantly lower than for white veterans after adjustment for both age and war zone exposure.

There were a few cases with missing data for most analyses. These cases were excluded on an analysiswide basis.

DISCUSSION

The major finding from HVVP is that Americans of Japanese ancestry had significantly lower prevalence of current full and partial PTSD and lifetime full PTSD than did white Vietnam veterans. This is contrary to results from both NVVRS and from the American Indian Vietnam Veteran Project (AIVVP) in which minority status was consistently associated with higher PTSD prevalence (Schlenger et al., 1992; Beals et al., 2002). To our knowledge, this is the first time any large-scale survey has detected lower PTSD prevalence in a minority cohort in comparison to Caucasian subjects.

This is a very strong finding when one considers that we had sufficient power to detect only large effects. This is because we used data from the clinical subsample of each ethnic cohort from NVVRS and HVVP, where the number of subjects in each ethnic group was roughly 100 or less. In contrast, NVVRS estimates are based on the total lay interview sample that included over 3,000 respondents. For example, although our estimates of current PTSD were very close to those originally reported for NVVRS, we could not detect the significant difference between black and white veterans that was reported previously (Schlenger et al., 1992). In our study, power to detect a difference between blacks and whites was 34% for current prevalence and 59% for lifetime prevalence (assuming a type I error rate of 5%).

To extend the findings of Beals et al. (2002), we have presented both unadjusted and age-adjusted prevalence estimates. Age adjustment might seem to yield the most valid estimates because of the difference in time between the NVVRS and HVVP. Yet given the confounding of age within the study cohorts, age adjustment may overadjust the findings and remove true effects of ethnicity. Thus, unadjusted results may be more valid. Whichever set of prevalence findings is most correct, it is worth noting that adjustment eliminated the difference between white and American Japanese veterans only in lifetime PTSD prevalence and not in current full and partial PTSD.

In NVVRS and AIVVP, when PTSD prevalence was adjusted for age and warzone exposure, significant differences between white and minority veterans either disappeared or narrowed considerably (Beals et al., 2002). Our finding that adjustment caused Hispanic-white differences to disappear completely is consistent with these results. This was not true, however, for Americans of Japanese ancestry in HVVP because odds ratios remained significantly different after adjustment for both age and war zone exposure. We can only conclude that factors other than war zone exposure must have distinguished veterans of Japanese ancestry from white veterans.

Given the length of the lay interview, which sometimes took 4–6 hours to complete, and given our Congressional mandate to replicate the original NVVRS interview as close as possible, we were unable to include questionnaire items by which to assess ethnographic and other factors. This is unfortunate, because inclusion of such items might have helped us understand the unique attributes of veterans of Japanese ancestry responsible for the present findings. Results from other studies suggest that Japanese traditions promoting the masking of one's true feelings (*honne*) from one's public expression of feeling (*tatemae*) results in strong reluctance to express emotional reactions or psychological distress in public. Other traditional values promoting endurance in the face of suffering (*gaman*), acceptance of one's fate (*shikata ga nai*), and somatizing emotional distress may also have contributed to our findings in HVVP (Sue and Sue, 1999). Unfortunately, we cannot make any definitive statements about the operation of such cultural factors because they were not investigated systematically in the present study. It is of interest in this regard that in the only other study of PTSD among Asian-Pacific Islander veterans of the Vietnam War, PTSD prevalence among Americans of Japanese ancestry was 0%, whereas it ranged from 13–40% among other Asian ethnic minority groups (Matsuoka and Hamada, 1991, 1992).

Native Hawaiian veterans appear to resemble the NVVRS cohorts more closely than Americans of Japanese ancestry with respect to war zone exposure and PTSD. They had the highest lifetime PTSD prevalence of any group, although the unadjusted odds ratio for this was not signifi-

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cantly different from whites. In view of the statistical significance reported in NVVRS for similar differences in magnitude, we believe that lack of significance for the lifetime PTSD comparison between Native Hawaiian and white veterans is another example of the low statistical power in HVVP.

In NVVRS, current PTSD prevalence was determined by a complicated process involving a composite diagnostic procedure that used three different instruments followed by an adjudication process for ambiguous cases. We believe that this approach has more ambiguity and less face validity than our approach, which relies heavily on SCID diagnosis and that adheres to strict decision rules. Our current prevalence estimates for NVVRS groups were based entirely on these decision rules, which is why there are slight differences between our NVVRS results and those reported previously.

Similarly, our procedure for computing partial PTSD rates is more explicit than in NVVRS. It is also entirely dependent on the SCID and clearly identifies diagnostic criteria for partial PTSD. For this reason, partial current and lifetime PTSD prevalence, as presented here, differ from those previously reported for the NVVRS cohort (Weiss et al., 1992). With the growing interest in partial PTSD by both clinicians and researchers, we believe that standardized criteria for making a partial PTSD diagnosis should be followed in future investigations so that results from one study can be compared with those from another.

CONCLUSIONS

The Hawaii Vietnam Veterans Project has shown that minority status, per se, does not predict higher PTSD prevalence among Vietnam veterans. Indeed, the lower prevalence of PTSD among American of Japanese ancestry compared with white veterans shows that ethnic minority status is not necessarily a risk factor for the development of PTSD. Furthermore, the difference between white veterans and veterans of Japanese ancestry could not be explained by differences in war zone exposure. In this regard, HVVP results differ markedly from NVVRS findings in which war zone exposure did predict PTSD prevalence among minority status veterans. It remains for future studies to investigate other factors that might have accounted for the low PTSD prevalence among veterans of Japanese ancestry detected in HVVP.

Our results suggest that Americans of Japanese ancestry may have a specific resilience to the impact of traumatic stress. In contrast, studies with Hispanic Vietnam veterans (Kulka et al., 1990) Hispanic survivors of the September 11th terrorist attacks in New York City (Galea et al., 2002) and Hispanic-American police personnel (Pole et al., 2001) suggest that this ethnocultural group may be more vulnerable to PTSD than others. Thus, it may be time to stop thinking in terms of white versus minority status as appropriate predictors of PTSD outcome. Instead, traumatic stress studies may have matured to the point where we need to be as specific about ethnocultural factors as we are about gender, age, socioeconomic, and other variables.

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