An Exploratory Examination of Risk-Taking Behavior and PTSD Symptom Severity in a Veteran Sample

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ABSTRACT The present study conducted an exploratory examination of the relationship between self-reported symptoms of post-traumatic stress disorder and an expanded definition of risk-taking behaviors among 395 veterans at a large Midwestern Veterans Affairs Medical Center. Post-traumatic stress disorder symptoms were associated with elevated rates of substance use, thrill seeking, aggression, risky sexual practices, and firearm possession. Results indicated that suicidal ideation and aggressive driving behavior were among the most frequently reported. The present findings hold significant public health implications and highlight the need to attend to risk-taking behaviors in treatment planning.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is a serious problem facing multiple generations of veteran populations, including the newest generation of active duty and veterans from Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) in Iraq and Afghanistan. It has been estimated that approximately 12% to 20% of veterans returning from Iraq and Afghanistan screen positive for PTSD,[1] whereas Vietnam veterans demonstrate a lifetime prevalence rate of 18.7%.[2] Studies have demonstrated that veterans diagnosed with PTSD have an increased risk for premature mortality many years after their military service.[3]

Over the past decade, researchers have examined the multiple pathways by which PTSD may contribute to observed associations with increased morbidity and mortality. Consistent with prominent theoretical models,[4] research has revealed the integral role of behavioral mechanisms in morbidity and premature mortality.[5] Engagement in risk-taking behaviors, defined as purposeful behaviors that involve potential negative consequence or loss, represent one such behavioral mechanism. Risk-taking behaviors have been found to be positively related to severity of trauma exposure and intensity of PTSD.[6] For instance, PTSD has been associated with a high frequency of substance use disorders,[7,8] interpersonal violence,[9] weapon possession, and weapon-related aggressive behavior.[10] The contribution of behavioral mechanisms was illustrated by a study examining causes of death in male Vietnam veterans seeking treatment for PTSD.[5] Specifically, 62.4% of all Vietnam veterans' deaths were accounted for by potentially preventable behavioral causes, including accidents (29.4%), chronic substance abuse (14.7%), and intentional death by suicide, homicide, or police (13.8%). For all these categories, mortality rates were significantly higher than would be expected in the general population.[5] Further, a subsequent study of these behaviors demonstrated that although factors pertaining to medical severity (e.g., recent medical hospitalization) were the most potent predictors of mortality, the presence of substance diagnosis is applied to the largest number of patients.[11]

In addition to increased mortality from risk-taking behaviors, research suggests that suicide remains a significant public health concern for all veteran populations. A recent report from 2006 suggests that suicide is on the rise among active duty service members, with the year 2006 having the highest number of confirmed cases since 1990.[12,13] Similarly, the Veterans Health Administration and media outlets reported that the rate of suicide among younger veterans had jumped by 26% from 2005 to 2007.[14] This is consistent with empirical studies which have found a higher suicide risk in OIF/OEF veterans when compared with previous war cohorts and the general population.[15,16] Studies examining patterns of risk factors have demonstrated elevated rates of suicidal behavior associated with veteran status,[13] PTSD diagnosis,[15,16] and history of traumatic brain injury (TBI).[17] The efficiency of prevention efforts, including assessment and treatment, can be enhanced by focusing on the populations at greatest risk.

Ben-Zur and Zeidner[6] reviewed several models that seek to account for the relationship between trauma exposure, PTSD, and risk-taking behavior. One model proposes that physical as well as psychological factors following exposure to trauma narrow people's attentional band, thus restricting the depth and breadth of their information processing. A second conceptual model proposes that risk-taking behavior serves to modulate one's emotional experience following trauma. Thus, an individual is motivated to engage in risk-taking behavior to lower negative effect related to the trauma and possibly enhance positive effect. Although there are several conceptual models available to begin understanding the relationship between PTSD and risk-taking behavior, there are several noteworthy limitations. First, studies examining

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risk-taking behavior within PTSD veteran samples have traditionally focused on a relatively narrow subset of risk-taking behaviors, namely substance abuse and violent behavior. For treatment purposes, there is a need to expand this definition to include the vast array of behaviors that could also be considered high risk, such as risky sexual behavior (e.g., unprotected sex, promiscuity), thrill-seeking behavior (e.g., racing cars, riding a motor cycle, skydiving), and unlawful activities (e.g., stealing, vandalism). Second, the majority of previous studies were based on Vietnam veteran samples. Initial studies of newly returning OEF/OIF veterans[18,19] suggest that risk-taking behaviors are common among this cohort; however, the prevalence of these behaviors has not been comprehensively examined. These results can better inform appropriate assessment and treatment planning and interventions.

The present study builds upon previous research by expanding the current conceptualization of risk-taking behaviors to include behaviors demonstrated to contribute to premature mortality.[20] Second, the present study tests for possible cohort differences in the incidence of risk-taking behaviors, a topic which to date has not been previously examined. We hypothesized that participants with higher levels of PTSD symptoms will exhibit increased rates of risk-taking behaviors.

METHOD

Participants and Procedure

Participants were 395 veterans receiving outpatient mental health and primary medical care services at a large Midwestern Veterans Affairs Medical Center. Participants were selected from both mental health and primary care clinics to give an accurate representation of the veteran population currently being served by the Veterans Affairs. All patients who presented for their clinic appointments were asked by clinic clerks to complete a brief anonymous questionnaire assessing current symptoms and lifestyle choices. All participants received a consent form and cover letter. The consent form explained the risks associated with participation, informed participants that participation was voluntary, and completion of the questionnaire was considered to be informed consent. All questionnaires were completed in the clinic waiting area. Initial administrations of the survey were supervised by project staff to ensure procedures were followed and to obtain an estimate of participant completion time (roughly 15 minutes). After this introductory period, clinic support staff supervised survey completion while project staff was in the clinic and available by pager if participants had questions about survey completion. Through the duration of data collection, no participants requested that staff be paged. All participants completed all or a substantial portion of the survey; none were turned in blank. This study was approved and overseen by the Minneapolis VAMC Human Studies Subcommittee.

Instruments

Brief Traumatic Brain Injury Screen

The Brief Traumatic Brain Injury Screen (BTBIS) was included for sample description. The brief traumatic brain injury screen is a 3-item screening tool validated in a small initial sample of soldiers who had served in Iraq and Afghanistan.[21] The screen is designed to identify individuals who may need further evaluation for mild TBI. Therefore, endorsement of items does not indicate the presence of a TBI.[21]

PTSD Checklist

The 17-item PTSD Checklist—Military version (PCL-M[22]) was used to assess past-month subjective PTSD symptom severity. Among the samples of veterans and non-veterans, Cronbach's α for the PCL total score has ranged from 0.96[23] to 0.94.[24] Consistent with these samples, Cronbach's α for the present sample was 0.96.

Risk-Taking Scale

A self-report survey used to assess the frequency of these behaviors developed specifically for use in this project. It was decided that a novel scale allowed for the assessment of behaviors that have been noted to be prominent in clinical settings and not captured in existing risk-taking measures. The scale included 42 items that were derived from a review of relevant literature.[25,26] Participants were asked "How often do you engage in each of the behaviors?" on a 5-point Likert scale ranging from 0 (never) to 4 (very often). Total scores ranged from 0 to 63, with higher scores indicating greater frequency. This scale demonstrated excellent reliability (Cronbach's $\alpha = 0.91$) in the current sample. Four subscales (aggression, risky sexual practices, substance abuse, and thrill seeking) were rationally derived. Internal consistency ranged from 0.83 to 0.85 for the subscales.

AUDIT-C Screening Questionnaire

The Alcohol Use Disorders Identification Test—Consumption (AUDIT-C) is a screening instrument consisting of the first three items of the full 10-item AUDIT.[27] Designed to identify individuals with problematic drinking (i.e., heavy drinking and/or alcohol abuse or dependence) in primary care settings, the AUDIT-C is well-validated, particularly among Veteran populations, and performs comparably to the full AUDIT. The AUDIT-C screening thresholds that simultaneously maximized sensitivity and specificity were ≥ 4 in men (sensitivity 0.86, specificity 0.89) and ≥ 3 in women (sensitivity 0.73, specificity 0.91).[28]

Weapon Ownership and Use Questions

Five items assessing participant weapon possession and usage were included. Items demonstrated to be associated with PTSD symptomatology in prior studies were assessed.[10] Participants were asked to indicate the number of guns, firearms,

and knives currently owned, greatest number owned in their lifetime, and the use of safe methods for storage. Each item was considered individually within analyses.

RESULTS

Demographics

A total of 395 patients completed the survey. The sample was overwhelmingly male (94.5%) and Caucasian (87.2%) with 77.2% from a mental health setting and the remaining 22.8% from primary care. Approximately half were married or in a committed relationship (53.7%) and over half were either disabled or retired (56.9%). Reflecting a mean age of 52.6 (14.5, range 18–89), the majority were from the Vietnam era (39.7%), followed by those from the Post-Vietnam era (21.3%) and OEF/OIF (14.3%). A small percentage (12.9%) served before the Vietnam era.

Measurement Descriptives

Prevalence of risk-taking behaviors by war era is reported in Table I. About one-third of the participants (32.5%) reported that they do not drink alcohol and about one in eight (12.9%) drink 4 or more times a week. Of those that drink, 27.1% report drinking 5 or more drinks on average when they drink and 10.7% admit to binge drinking weekly or more often. The mean score on the PCL was 46.4 (19.2). Based on self-report, over half (53.6%) report receiving at least one injury while serving and 41.8% endorsed at least 1 symptom commonly associated with TBI as a consequence of the injury. The most common symptoms after injury were ringing in ears (40.8%), irritability (30.1%), and sleep problems (41.3%). About half report owning at least 1 firearm (52.6%), with 20.3% owning 5 or more firearms. Three quarters of respondents (74.8%) report keeping firearms in a gun safe or disassembled. About two-thirds (64.6%) report owning at least 1 large knife (5″ blade or greater), with 22.8% owning 5 or more large knives.

Cohort Differences

Risk-taking total score, subscales, and the PCL were examined for differences by war era. Given the small number of veterans from World War II, Korea, and Post-Korea, veterans from those three cohorts were combined into one "Pre-Vietnam" group for comparisons. All comparisons were nonsignificant with the following exceptions. OEF/OIF veterans were significantly higher than all other cohorts on the PCL with a mean of 53.7 (15.5), $F(1, 338) = 10.3$, $p = 0.001$. There were no significant differences on total risky behavior $F(1, 338) = 0.29$, $p = 0.59$. OEF/OIF veterans had significantly higher scores on the Aggression subscale $F(1, 356) = 4.7$, $p = 0.03$; higher counts of Aggression $F(1, 375) = 4.8$, $p = 0.03$; and risky sexual practice items endorsed $F(1, 375) = 5.7$, $p = 0.02$. Based on this, we examined the individual items contained in the aggression subscale and found that OEF/OIF veterans were more likely to report "Yelling or making angry hand gestures while driving" (72%) than other veterans, but did not differ significantly on other individual items.

Differences in Risk-Taking Behaviors

We used the suggested cutoff of 50[29] to separate the sample and compared individuals' expression of risk-taking behavior, weapon possession, and alcohol use. Individuals who scored higher than 50 on the PCL endorsed higher on the total risk frequency $F(1, 350) = 32.87$, $p < 0.001$; substance use behaviors subscale $F(1, 351 = 10.37$, $p < 0.001)$; thrill-seeking behaviors subscale $F(1, 354) = 21.81$, $p < 0.001$; sexual behaviors subscale $F(1, 351) = 13.59$, $p < 0.001$; aggression subscale $F(1, 351) = 39.56$, $p < 0.001$; and the AUDIT-C $F(1, 354) = 6.65$, $p = 0.001$). All comparisons of weapon possession were nonsignificant.

Correlations

Table II displays correlation coefficients between measures total and subscale scores. Correlations between PTSD, risk behavior subscales, and weapon possession were in expected directions. PTSD symptomatology was significantly associated with total risk frequency $r = 0.38$, $p < 0.01$; thrill-seeking behaviors, $r = 0.28$, $p < 0.05$; aggressive behavior, $r = 0.42$, $p < 0.01$; and the number of combat-type knives currently owned, $r = 0.33$, $p < 0.01$. Total risk frequency was significantly correlated with all four risk subscales and self-rated alcohol consumption on the AUDIT-C, $r = 0.39$, $p < 0.01$, and the number of combat-type knives currently owned, $r = 0.39$, $p < 0.001$.

DISCUSSION

The purpose of the present study was to conduct an exploratory examination of the relationship between symptoms of PTSD and an expanded definition of risk-taking behaviors among veterans. As hypothesized, PTSD symptoms were significantly associated with elevated rates of overall frequency of risk-taking behaviors, alcohol use, and firearm possession. The present findings are consistent with other veteran samples which have documented the association between alcohol and substance use, interpersonal aggression, firearm possession, thrill-seeking behaviors, and PTSD symptomatology.[6,10,30,31] Prior research among civilian samples has found that trauma exposure[32–34] is associated with sexual risk taking. Among veterans, PTSD has been shown to be a risk factor for human immunodeficiency virus infection among veterans.[35] The present study is among the first to demonstrate a relationship between PTSD and sexual risk taking among veterans.

The use of an expanded conceptualization of risk-taking behavior also revealed that risky and aggressive driving practices (e.g., making angry hand gestures at other drivers, driving after drinking), suicidal ideation, and sexual risk taking (e.g., having unprotected sex) were among the most frequently occurring behaviors. Although the present design did not allow for comparison with a nontreatment seeking

TABLE I. Risk-Taking Item Means and Prevalence by War Era

Items	OEF/OIF		Post-PGW		PGW		Post-VN		VN		Pre-VN		Total Sample	
	M	%	*M*	%	*M*	%	*M*	%	*M*	%	*M*	%	*M*	%
Thrill Seeking														
Sacrificing Safety to Speed When Driving a Car	1.32	59.3	1.64	58.4	1.14	42.9	1.19	52.4	1.09	47.1	0.52	28.5	1.09	37.3
Thinking About Suicide	1.08	54.2	1.00	41.7	1.71	57.2	1.46	67.8	1.29	54.7	0.82	37.2	1.24	53.9
Breaking the Law	0.80	44.4	0.82	50.5	0.86	42.9	0.85	48.8	0.78	41.4	0.64	37.3	0.78	43.3
Doing Something Dangerous Because Someone Dared You To	0.78	44.6	0.52	29.2	0.29	14.3	0.54	29.7	0.44	21.6	0.08	5.9	0.46	25.1
Going to a "Wild" Uninhibited Party	0.70	37.1	0.45	33.3	0.43	28.6	0.51	27.4	0.35	16.9	0.18	7.9	0.41	21.5
Swimming Alone Far Out From Shore	0.60	37.0	0.76	41.7	0.57	28.6	0.57	28.6	0.48	20.3	0.47	17.6	0.53	25.0
Riding a Motorcycle	1.00	38.9	0.59	29.2	1.43	42.9	1.05	41.7	1.37	43.3	0.84	33.3	1.13	40.0
Doing Something Illegal, But Enjoyable	0.51	29.7	0.81	45.9	1.14	28.6	0.57	29.8	0.63	35.0	0.20	13.7	0.56	30.9
Riding a Motorcycle Without a Helmet	0.70	29.7	0.48	16.8	1.00	42.9	0.75	27.6	1.23	38.2	0.69	25.5	0.92	31.9
Skiing Fast Down High Mountain Slopes	0.46	21.5	0.86	41.7	1.14	57.1	0.41	17.9	0.29	14.0	0.18	7.9	0.37	17.2
Racing Cars	0.52	27.9	0.36	16.7	0.29	14.3	0.38	22.6	0.65	26.8	0.31	17.6	0.49	23.5
Nude Swimming in the Company of Persons of Both Sexes	0.28	20.5	0.33	16.7	0.00	0.0	0.40	21.4	0.51	23.5	0.19	11.8	0.38	20.0
Stealing Something	0.29	16.7	0.41	25.0	0.57	28.6	0.44	23.4	0.44	24.2	0.37	23.6	0.40	22.8
Gambling for High Stakes	0.14	9.3	0.36	25.0	0.00	0.0	0.28	15.5	0.38	17.9	0.10	5.9	0.29	15.2
Parachute Jumping/Sky Diving	0.32	13.0	0.23	8.4	0.57	42.9	0.35	17.9	0.20	10.8	0.10	5.9	0.29	11.7
Mountain Climbing	0.29	24.1	0.36	25.0	0.57	42.9	0.35	17.9	0.20	10.8	0.10	5.9	0.25	14.4
Hitchhiking	0.12	5.6	0.19	8.3	0.00	0	0.39	20.2	0.45	23.0	0.36	19.7	0.34	17.8
Intentionally Cutting or Burning Yourself	0.04	3.7	0.00	0.0	0.29	14.3	0.26	11.0	0.15	7.0	0.04	2.0	0.66	6.9
Playing Russian Roulette With a Loaded Handgun	0.04	1.9	0.00	0.0	0.00	0.0	0.01	1.2	0.04	1.9	0.00	0.0	0.03	1.8
Risky Sexual Practices														
Having Unprotected Sex	1.65	57.4	1.45	58.4	0.71	42.9	1.22	34.5	0.94	35.0	0.88	33.3	1.11	41.8
Having a Sexual Relationship With Someone You Just Met and May Not See Again	0.77	44.7	0.82	50.0	0.29	14.3	0.81	39.3	0.59	27.4	0.47	25.5	0.65	33.2
Being Sexually Promiscuous	0.94	46.3	0.95	50.0	0.43	28.6	0.83	38.2	0.63	28.7	0.27	17.6	0.67	33.0
Having Sex in Public	0.58	35.2	0.36	25.0	0.43	28.6	0.37	20.2	0.29	13.3	0.02	2.0	0.31	17.4
Cheating on Your Partner	0.27	16.7	0.41	25.0	0.57	28.6	0.52	25.0	0.36	18.4	0.36	17.7	0.38	20.0
Having Sex With More Than One Person on the Same Day	0.35	18.6	0.36	16.7	0.00	0.0	0.33	17.8	0.39	17.2	0.04	3.9	0.30	15.2
Trading Sex for Drugs or Money	0.04	1.9	0.05	4.2	0.00	0.0	0.05	2.4	0.11	5.1	0.04	2.0	0.07	3.6
Substance Abuse														
Smoking Cigarettes	1.61	46.3	1.23	41.7	1.00	42.9	1.52	51.2	1.25	36.9	0.92	33.4	1.33	42.0
Driving After Drinking Alcohol	0.62	38.9	0.68	33.3	0.71	42.9	1.00	51.2	1.01	44.0	0.68	41.2	0.87	43.6
Using Marijuana	0.63	31.6	0.45	29.2	0.57	28.6	0.73	33.4	0.82	32.5	0.18	7.9	0.64	28.6
Getting "High"	0.55	27.8	0.48	20.8	0.57	28.6	0.69	29.9	0.60	25.5	0.27	15.7	0.55	24.6
Trying Cocaine	0.28	18.5	0.10	8.3	0.00	0.0	0.53	27.4	0.33	15.9	0.08	0.59	0.31	16.4
Driving After Taking Recreational Drugs	0.20	14.8	0.05	4.2	0.00	0.0	0.39	17.8	0.32	14.6	0.08	5.9	0.25	12.9
Taking an Unknown Drug	0.10	7.5	0.00	0.0	0.00	0.0	0.24	11.9	0.27	13.3	0.10	5.9	0.19	10.2
Trying Heroin	0.00	0.0	0.00	0.0	0.00	0.0	0.08	4.8	0.11	5.0	0.04	2.0	0.07	3.7
Trying the Drug Lysergic Acid Diethylamid (i.e., LSD)	0.00	0.0	0.05	4.2	0.00	0.0	0.26	14.3	0.29	13.9	0.06	5.9	0.18	10.3
Aggression														
Yelling or Making Angry Hand Gestures While Driving	1.86	72.2	1.5	58.4	1.00	57.2	1.27	61.9	1.10	51.0	0.67	37.3	1.22	56.0
Making Verbal Threats to Others	1.06	51.8	1.1	54.5	0.57	28.6	0.95	53.6	0.84	41.4	0.39	23.5	0.84	42.6
Intentionally Cutting Off or Chasing Another Driver	0.55	37.4	0.86	41.7	0.14	14.3	0.48	29.8	0.58	29.3	0.10	7.9	0.48	26.8
Pushing or Shoving Another Person	0.58	33.3	0.43	29.1	0.14	14.3	0.72	41.8	0.57	26.8	0.16	9.8	0.53	26.3
Intentionally Trying to Intimidate Someone	0.82	22.3	0.68	33.7	0.43	28.6	0.80	41.6	0.65	33.1	0.27	13.8	0.66	31.9
Picking a Fistfight	0.40	25.9	0.33	20.9	0.00	0.0	0.34	19.0	0.34	16.5	0.10	5.9	0.31	17.2
Intentionally Damaging Property	0.35	22.3	0.23	12.5	0.00	0.0	0.32	16.6	0.21	12.7	0.06	4.0	0.23	13.5
Intentionally Driving Your Vehicle Into Another Object (Tree, Other Car)	0.06	5.6	0.00	0.0	0.00	0.0	0.13	7.2	0.06	3.8	0.00	0.0	0.07	4.3

PGW = Persian Gulf War I; VN = Vietnam.

sample, rates of several risk-taking behaviors have been reported in the general population. When compared to published rates in general samples, the present study demonstrated elevated rates of cigarette smoking[36] (42% vs. 21%), marijuana use[36] (28.6% vs. males-7.9%, females-4.4%), and drinking and driving[37] (43.6% vs. 20%).

Prior research has demonstrated elevated rates of suicide and suicidal ideation associated with deployment[38] and

TABLE II. Correlations Between PTSD Symptoms, Risk-Taking Subscales, Alcohol Use, and Weapons Possession

Variable	PCL[a]	Total Risk[b]	Thrill[c]	Sex[d]	SUD[e]	ABS[f]	AUDIT[g]	Firearm[h]	Guns[i]	Lifetime[j]	Knives[k]
PCL	—										
Total Risk	0.38**	—									
Thrill	0.28*	0.88**	—								
Sex	0.20	0.81**	0.58**	—							
SUD	0.17	0.52**	0.34**	0.40**	—						
ABS	0.42**	0.76**	0.69**	0.46**	0.22	—					
AUDIT	0.14	0.37**	0.27*	0.37**	0.40**	0.16	—				
Firearm	0.13	0.15	0.15	0.21	–0.18	–0.08	0.14	—			
Guns	0.12	0.17	0.16	0.25*	–0.21	0.01	0.11	0.77**	—		
Lifetime	0.15	0.20	0.18	0.22	–0.09	0.00	0.18	0.91**	0.75**	—	
Knives	0.33**	0.39**	0.42**	0.25*	–0.06	0.48**	0.13	0.19**	0.22	0.19	—

*$p < 0.05$, **$p < 0.01$.

[a]PCL = PTSD Checklist total score. [b]Total risk = risk-taking scale total score. [c]Thrill = thrill-seeking subscale. [d]Sex = risky sexual practices subscale. [e]SUD = substance abuse subscale of the risk-taking scale. [f]ABS = Aggressive behavior subscale. [g]AUDIT = Alcohol Use Disorders Identification Test screening questionnaire. [h]Firearm = number of firearms currently owned. [i]Guns = number of handguns currently owned. [j]Lifetime = greatest number of firearms owned lifetime, excluding military service. [k]Knives = number of combat-length knives currently owned.

PTSD.[39,40] The present study found that the lifetime prevalence of suicidal ideation was approximately 4 times (53.9%) greater than rates in the general population (13.5%).[41] These findings reinforce the need for awareness, early detection, and intervention with this particularly high-risk group.

With respect to cohort differences, our results indicate that OEF/OIF era veterans reported higher levels of PTSD symptom severity compared to other war eras. With regards to risk-taking behaviors, we found higher rates of aggressive behavior, sexual risk taking, and risky driving practices in OEF/OIF veterans. These findings may be accounted for by several factors. First, research has demonstrated that the processes that underlie risk-taking behavior tend to increase in adolescence and decline thereafter.[42] Thus, the risk period most closely coincides with the age groups represented in the OEF/OIF cohort. Further, these same behaviors may not be represented in the present older veteran sample given the possibility that individuals who engage in these behaviors may have died prematurely because of increased negative health outcomes associated with many of these behaviors.[5] In addition to experiencing increased distress following deployment, the increased incidence of risky driving practices among the OEF/OIF cohort may be accounted for by exposure to insurgency warfare such as improvised explosive devices that were not as characteristic of previous conflicts.[43] Research supports the link between specific combat stressors and risky driving behaviors.[18]

These findings hold significant public health implications. Research has demonstrated the negative long-term health consequences associated with alcohol misuse, risky sexual behavior, and use of weapons.[20] The present findings also raise concerns regarding the potential for motor vehicle accidents because of driving-related anger and risky driving behaviors. The present findings contribute to the literature, demonstrating increased rates of aggressive and unsafe driving,[19,44] motor vehicle accidents in nondeployed soldiers[45] as well as soldiers returning from deployment.[46] Given the frequency of unsafe and aggressive driving behaviors in the present sample and previous studies,[19] future studies are needed to examine the impact of clinical interventions on reducing the incidence and impact of these harmful behaviors.

Media and anecdotal reports from Veterans Affairs clinicians indicate awareness and concern for the role of these behaviors in veterans' lives; however, this study suggests that these behaviors may be far more prevalent and pervasive than initially thought. The present findings underscore the importance of assessing for the incidence of risk-taking behaviors among veterans. Nuanced assessment of these behaviors yields clinically relevant material such as trauma-related cognitions and dysfunctional coping strategies, which may inform clinical interventions and treatment strategies. Additional research examining the impact of treatment on risk- and thrill-seeking behaviors within veteran samples is warranted. For instance, given the frequency of driving-related aggressive behaviors found within the OEF/OIF cohort, research studies examining the application of driving-related anger treatment protocols would likely be applicable to a large number of veterans as well as civilians who engage in such behaviors.

LIMITATIONS

There are several limitations that must be considered in conjunction with the present findings. First, the study was cross-sectional in nature, prohibiting tests of causal relationships. Next, study methodology precluded the use of clinical interview or chart review to verify symptom presentation. Prior research has demonstrated that self-report measures of PTSD tend to be significantly related to general distress.[47] Future studies may benefit from the inclusion of interview-based measures of PTSD symptom severity. Further, the present study did not incorporate a measure of trauma exposure. Therefore, it is not possible to determine the contribution of varying levels and types of trauma exposure on the expression

of risk-taking behaviors. Next, we used a novel risk-taking measure designed for the present study. Although the measure demonstrated good internal consistency with the total scale and rationally derived subscales, it requires further research to examine its psychometric properties. Finally, the present sample was predominantly comprised Caucasian males, which raises questions as to whether similar relationships would generalize to other Veteran samples such as ethnically diverse, mixed gender, or female samples.

In summary, despite the noted limitations, the present study advances research on risk-taking behavior among veterans, an understudied problem that holds significant costs to veterans, their family, and society. The findings underscore the importance of thorough assessment of these behaviors in veteran populations and the need for future research on treatment on high-risk behaviors. The present study also suggests the need for future research examining the impact of existing treatments on risk-taking behaviors.

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