

Cancer-related PTSD symptoms in a veteran sample: association with age, combat PTSD, and quality of life

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Abstract

Objective: The diagnosis and treatment of cancer is a potentially traumatic experience that may evoke posttraumatic stress symptoms (PTSS) among survivors. This paper describes the rates of endorsement of cancer-related PTSS along with the relationship of demographic, cancer, and combat variables on PTSS and quality of life.

Methods: Veterans ($N=166$) with head and neck, esophageal, gastric, or colorectal cancers were recruited through tumor registries at two regional Veterans Administration Medical Centers. Standardized scales were used to assess self-report of PTSS, combat, and quality of life.

Results: Most participants (86%) reported experiencing at least some cancer-related PTSS; 10% scored above a clinical cutoff for probable PTSD. In linear regressions, younger age and current combat PTSS were associated with cancer-related PTSS, whereas disease and treatment characteristics were not; in turn, cancer-related PTSS were negatively associated with physical and social quality of life.

Conclusions: Individual characteristics and psychosocial factors may play a larger role than disease-related variables in determining how an individual responds to the stress of cancer diagnosis and treatment. Given the rates of reported cancer-related PTSS in this sample, and other non-veteran samples, clinicians should consider screening these following diagnosis and treatment, particularly in younger adults and those with previous trauma histories.

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Introduction

The diagnosis and treatment of cancer is a potentially traumatic experience that may evoke posttraumatic stress symptoms (PTSS). The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [1] notes that a life-threatening illness 'is not necessarily considered a traumatic event', but that medical incidents that are 'sudden' and 'catastrophic' may qualify (p. 274), while 'being diagnosed with a life-threatening illness' was listed as a potentially traumatic event in DSM-IV [2]. Posttraumatic stress disorder (PTSD) is characterized by symptoms including intrusion (e.g., recurrent distressing dreams of the trauma), avoidance of thoughts or reminders of the trauma, negative alterations in cognition and mood, and marked alterations in arousal and reactivity. Cancer survivors who perceive their diagnosis as life-threatening may experience these types of symptoms, including re-experiencing aspects of the diagnosis or treatment, avoiding reminders of the disease or treatment, and difficulty concentrating or irritability. A growing literature examining PTSD symptomatology among cancer survivors has found rates of cancer-related PTSD from 0% to 35%, most often in the range of 10% (see [3], for a review), similar to rates

of PTSD for other traumatic stressors [4]. An even greater proportion (16–56%, e.g., [5,6]) of survivors endorse PTSS (i.e., symptoms that do not meet full criteria for diagnosis).

Factors found to be associated with cancer-related PTSS include more intense treatment [7], more advanced cancer (e.g., [5,8]), younger age [9–11], lower education [12], and prior psychiatric history [13]. Mixed results have been found for other factors including cancer stage, type of treatment, and history of cancer recurrence (e.g., [5,8,10,14,15]). Prior life stressors and traumatic events also increase risk of developing PTSS following a cancer diagnosis (e.g., [8,16,17]). The presence of cancer-related PTSS may further impair quality of life in a variety of domains, including physical, emotional, and social functioning [5,6].

The majority of research on cancer-related PTSS focuses on female survivors of breast cancer. Less is known about the prevalence of PTSS in other cancer types or patient populations. One understudied group is military veterans. There are now half a million veterans in the Veterans Health Administration who are cancer survivors [18], yet the issue of cancer-related PTSS is largely unexamined in this population. Veterans may have unique

risk factors for some cancers because of deployment-associated toxin exposure (e.g., Agent Orange). Additionally, some veterans may enter the cancer experience with concurrent combat-related PTSS, whereas others may have successfully adapted to combat trauma, perhaps providing a protective factor in managing the stress of cancer [19].

In this paper, we describe the rates of cancer-related PTSS in a veteran sample with a diverse range of oral-digestive cancers, examine the effect of prior combat and combat-related PTSD on cancer-related PTSS, and determine variables associated with cancer-related PTSS and quality of life. On the basis of previous research, we hypothesized that combat-related PTSD and cancer-related variables would be associated with greater symptoms of cancer-related PTSS, and that both combat-related and cancer-related PTSS would be associated with lower physical and social quality of life.

Method

Participants

Participants were recruited from Veterans Health Administration tumor registries in Boston and Houston. Eligible participants received a diagnosis of and treatment for oral (head and neck), esophageal, gastric, or colorectal cancer, were English speaking, and did not have psychotic or dementing disorders. These cancer types were selected as they are relatively prevalent among veterans, have variable prognoses yet may be perceived as life-threatening, and have commonalities in risk factors and long-term side effects. Full information on the study protocol is available elsewhere [20].

Procedure

Participants completed in-person structured interviews 6 months following their cancer diagnosis (median = 195 days post-diagnosis, range 157–268) at the medical center or in their home. Participants were compensated \$30 for their participation. This study was approved by the Institutional Review Boards of the Boston and Houston (Michael E. DeBakey) Veterans Affairs Medical Centers.

Measures

Demographics

Participants reported their age, gender, racial and ethnic identities, and level of education.

Cancer information

Information about the cancer diagnosis, stage, and treatment (surgery, chemotherapy, and/or radiation) was obtained from medical records. For the purpose of data analyses, disease stage was dichotomized as metastatic (stage IV) versus local (stages I–III), as treatment options and

prognoses differ most significantly between these stages. The number of treatment types received was summed as a proxy of treatment intensity, in the absence of detailed treatment data.

Combat experience and combat-related PTSD

If the participant endorsed combat experience, the 4-item Primary Care PTSD Screen (PC-PTSD; [21]) was used to assess military-related PTSD. This 4-item measure uses a yes/no response format to assess the occurrence of intrusive thoughts/dreams about the military, avoidance of thoughts or situations that are reminders of the military, feeling on guard or easily startled, and feeling numb or detached from others in the past month. Cronbach's alpha was .88 in this sample. After summing the items, a cutoff score of 3 (previously validated in a VA population [21]), identified probable PTSD. Next, the sample was divided into groups with 'non-combat', 'combat-only' (combat exposure but PC-PTSD score 0–2), and 'combat + PTSD' (PC-PTSD score 3–4).

Cancer-related PTSD

The 17-item Posttraumatic Stress Disorder Check List-Stressor-Specific version (PCL-S; [22,23]) was used to assess cancer-related PTSS in the past week. To orient respondents to cancer as the traumatic event, each item was amended to refer to cancer (e.g., 'Repeated, disturbing memories, thoughts, or images of cancer, your diagnosis or treatment?') as similarly adapted for breast cancer survivors [8,9,24]. Items rated on a 5-point scale (1 = 'not at all' to 5 = 'extremely') were summed to create a total symptom severity score. Additionally, a cutoff score of 50 (previously validated in a breast cancer population [24]) was identified as probable PTSD. Cronbach's alpha for this sample was 0.93.

Health-related quality of life

The physical and social subscales of the Patient-Reported Outcomes Measurement Information System (PROMIS) [25] were used to measure health-related quality of life in the past week. PROMIS is a measurement system for patient-reported health status for physical, mental, and social well-being. Participants rated on a 5-point scale their ability to function in each domain in the past 7 days. Subscale scores were summed, with higher scores indicating better functioning. These analyses include the subscales of Physical Function (four items), which focuses on abilities to do activities (e.g., 'Are you able to do chores such as vacuuming or yard work?'; $\alpha = 0.90$ in this sample), and Social Function (four items), which focuses on satisfaction with ability to work and/or complete regular responsibilities (e.g., 'I am satisfied with my ability to perform my daily routine'; $\alpha = 0.95$).

Data analysis

Preliminary descriptive analyses were conducted to evaluate the sample demographics, and bivariate analyses were conducted to identify relationships among covariates and clinical measures. Differences in cancer-related PTSD symptoms (total PCL scores) between combat groups were examined through MANOVAs and post hoc Tukey tests.

Hierarchical linear regression was conducted to determine which demographic, cancer-related, and combat-group variables were associated with greater cancer-related PTSS (PCL total scores). The first step of the regression evaluated demographic variables (age, race, and education), the second step added cancer-related variables (number of treatment types and disease stage), and the final step evaluated dummy-coded combat-group variables ('non-combat' as the reference group). Multicollinearity was evaluated among the variables, and no predictors were found to be multicollinear (all tolerance values <0.10). Additional hierarchical regression evaluated the association of these variables with physical and social quality of life. All analyses were conducted in SPSS 21 (IBM Corp. Armonk, NY, USA).

Results

Sample

The study included 166 participants with complete data (from a total of 170 interviewed). See Table 1 for details.

Table 1. Bivariate associations with total PCL scores

Variable	N	%	M	SD	r/t
Age	166				$r = -0.36^{***}$
Education	166				$r = -0.07$
Race					
Caucasian/White	135	81	28.99	12.96	$t = 4.48^{***}$
African American and all others ^a	31	19	31.97	16.1	
Cancer type					
Head and neck	67	40	30.39	14.56	$t = 0.76$
Colorectal	81	49	28.12	12.45	$t = 1.35$
Gastro-esophageal	18	11	32.83	14.77	$t = 0.09$
Cancer stage					
Stages I–III	122	73	28.38	13.3	$t = 0.47$
Stage IV	43	26	32.95	14.15	
Treatment type					
Surgery	120	74	29.98	14.12	$t = 2.53$
Chemotherapy	102	61	31.02	14.18	$t = 0.72$
Radiation	70	42	31.1	14.63	$t = 1.68$
Number of treatment types	166				$r = 0.22^{**}$
Combat PTSS	166				$r = 0.52^{***}$
Social role	166				$r = -0.49^{***}$
Physical function	166				$r = -0.38^{***}$

PCL, Posttraumatic Stress Disorder Check List; PTSS, posttraumatic stress symptoms.

^aBecause of small cell size, race was collapsed into two categories for statistical analyses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Most participants were older ($M = 64.7$, $SD = 9.44$) Caucasian men (163 men and 3 women), and 51% attended some college or were college graduates. Colorectal cancer and head and neck cancer were most common. Stage of disease varied for each patient, and the sample included patients who were initially diagnosed with stages I–IV (N : I = 39, II = 46, III = 37, and IV = 43). About half (56%) were non-combat, 28% saw combat but did not endorse current combat-related PTSD symptoms, and 16% reported current combat with probable PTSD.

Cancer-related posttraumatic stress symptoms

Most participants (85.5%) reported experiencing some PTSS as a result of their cancer experience. PCL scores ranged from 17 to 76 ($M = 29.55$, $SD = 13.60$) with 10% above the cut off score of 50. Table 1 presents the bivariate associations between demographic and disease variables and total cancer-related PTSD symptoms. Younger age, non-Caucasian race, and more treatment types were associated with more cancer-related PTSS. There were no significant differences in total PCL scores based on cancer type, stage, or type of treatment. With regard to quality of life, patients who experienced more cancer-related PTSS endorsed worse physical functioning and reported less satisfaction with their social role.

Group comparison of cancer-related PTSD symptoms

Participants with combat+PTSD reported more cancer-related PTSS than those in the non-combat or combat-only groups. Among the participants with current combat-related PTSD symptoms, 37% scored above the clinical cutoff for cancer-related PTSD, whereas 7% of the participants without combat and 0% of the participants with combat but no combat-related PTSD scored above the cutoff, $\chi^2 = 27.08$, $p < 0.001$. Results of MANOVA examining group differences on the PCL based on combat exposure and presence of combat-related PTSD indicated that those with combat exposure with current PTSD reported significantly higher scores than those with no combat exposure and those with combat exposure without current PTSD (Table 2). The group with no combat exposure and the group with combat exposure but no current combat-related PTSD did not differ significantly on symptom severity.

Variables associated with cancer-related PTSS

Hierarchical regression was conducted to evaluate the relationships between demographic, cancer-related, and combat-group variables and total cancer-related PTSD symptoms (Table 3). The demographic variables, cancer-related variables, and combat-group variables all accounted for a significant additional proportion of the variance in cancer-related PTSS. Although the combination of

Table 2. Combat-group associations with PCL

	Group								Group comparison		
	Total sample (N= 166)		A Non-combat (N= 93)		B Combat-only (N= 46)		C Combat + PTSD (N= 27)		SE (p)		
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	A : B	A : C	B : C
PCL total scores	29.55	(13.60)	27.55	(11.80)	24.13	(8.08)	45.67	(15.20)	2.08 (0.23)	2.53 (<0.01)	2.80 (<0.01)

PCL, Posttraumatic Stress Disorder Check List; PTSD, posttraumatic stress disorder.

cancer-related variables at Step 2 of the model accounted for a significant additional proportion of the variance, neither disease stage nor number of treatment types was significantly associated with cancer-related PTSS on their own. At the final step in the model, younger age and the presence of combat-related PTSD were both significantly associated with greater cancer-related PTSS.

Variables associated with health-related quality of life

Social role satisfaction

Demographic variables and cancer-related variables did not significantly contribute to the model, but combat-group variables and cancer-related PTSS led to a significant change in the overall model (Table 3). In the final

Table 3. Hierarchical linear regression analyses predicting cancer PTSS, social role, and physical functioning

	Cancer PTSS			Social role			Physical function		
	B	SE	Beta	B	SE	Beta	B	SE	Beta
<i>Step 1</i>		$\Delta R^2 = 0.13^{***}$			$\Delta R^2 = 0.03$			$\Delta R^2 = 0.02$	
Age	-0.50***	0.11***	-0.35***	0.07	0.04	0.12	0.03	0.04	0.07
Race	-1.91	2.58	-0.05	-0.02	1.06	0.00	0.20	0.96	0.02
Education	-1.09	1.07	-0.07	0.74	0.44	0.13	0.51	0.40	0.10
<i>Step 2</i>		$\Delta R^2 = 0.03^*$			$\Delta R^2 = 0.02$			$\Delta R^2 = 0.01$	
Age	-0.45***	0.11***	-0.31***	0.05	0.04	0.09	0.02	0.04	0.04
Race	-2.19	2.56	-0.06	-0.02	1.06	0.00	0.20	0.96	0.02
Education	-1.31	1.07	-0.09	0.81	0.44	0.14	0.57	0.40	0.11
Disease stage	3.31	2.33	0.11	-0.14	0.97	-0.01	-0.11	0.89	-0.01
Number of treatment types	2.09	1.32	0.12	-0.88	0.55	-0.13	-0.67	0.50	-0.11
<i>Step 3</i>		$\Delta R^2 = 0.22^{***}$			$\Delta R^2 = 0.12^{***}$			$\Delta R^2 = 0.06^{**}$	
Age	-0.38***	0.09***	-0.27***	0.03	0.04	0.05	0.01	0.04	0.02
Race	-2.33	2.20	-0.07	0.01	0.99	0.00	0.23	0.94	0.02
Education	-0.71	0.92	-0.05	0.72	0.42	0.13	0.50	0.40	0.10
Disease stage	2.65	2.01	0.09	0.05	0.91	0.00	0.03	0.87	0.00
Number of treatment types	1.21	1.15	0.07	-0.55	0.52	-0.08	-0.51	0.49	-0.09
Combat exposure without PTSD ^a	-2.56	1.99	-0.08	2.33**	0.89**	0.20**	1.28	0.85	0.12
Combat exposure with PTSD ^a	16.61***	2.41***	0.45***	-3.67***	1.12***	-0.25***	-2.31*	1.04*	-0.18*
<i>F-test for final step</i>		$F(7, 164) = 14.29^{***}$			—			—	
<i>Step 4</i>		—			$\Delta R^2 = 0.13^{***}$			$\Delta R^2 = 0.09^{***}$	
Age	—	—	—	-0.04	0.04	-0.07	-0.04	0.04	-0.08
Race	—	—	—	-0.36	0.93	-0.03	-0.06	0.90	-0.01
Education	—	—	—	0.62	0.39	0.11	0.42	0.38	0.08
Disease stage	—	—	—	0.48	0.85	0.04	0.36	0.84	0.03
Number of treatment types	—	—	—	-0.38	0.49	-0.06	-0.36	0.47	-0.06
Combat exposure without PTSD ^a	—	—	—	1.88*	0.84*	0.16*	0.92	0.82	0.09
Combat exposure with PTSD ^a	—	—	—	-0.91	1.18	-0.06	-0.22	1.13	-0.02
Cancer-related PTSD	—	—	—	-0.17***	0.03***	-0.43***	-0.13***	0.03***	-0.37***
<i>F-test for final step</i>		—			$F(8, 161) = 7.75^{***}$			$F(8, 161) = 3.92^{***}$	

^aNon-combat is the reference group.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

step, combat exposure without combat PTSD and fewer cancer-related PTSS were both significantly associated with greater social role satisfaction.

Physical functioning

Demographic variables and cancer-related variables did not significantly contribute to the model, but combat-group variables and cancer-related PTSS led to a significant change in the overall model. In the final step, only cancer-related PTSS was significantly associated with lower physical functioning.

Discussion

In this study, cancer-related PTSS were prevalent in a sample of military veterans 6 months post-diagnosis of oral-digestive cancers. Our finding that 10% of participants exceeded a cutoff score indicating probable PTSD is consistent with the prevalence estimates of cancer-related PTSD [3] in the current literature. In multivariate analyses, younger age and presence of combat-related PTSD were significantly related to higher levels of cancer-related PTSS, whereas cancer-related variables including number of treatment types and stage were not. Results from previous studies investigating relationships between cancer severity and subsequent cancer-related PTSS have been mixed, and this study is consistent with others that failed to find a significant relationship (e.g., [15]). These findings suggest that individual characteristics and psychosocial factors may play a larger role than disease-related variables (i.e., the objective severity of the disease or treatments) in determining how an individual responds to the stress of cancer.

As in this study, younger age is associated with cancer-related PTSD symptoms in other studies (e.g., [9]). This may be explained by the idea that younger individuals are less accustomed to receiving serious medical diagnoses and may perceive a cancer diagnosis as a more traumatic experience, whereas older adults may have had more previous experience with illness. Generational differences and cultural factors may also contribute to different outcomes based on age. Additionally, social responsibilities and life circumstances may vary by age, such that failing health may cause greater disruption to social roles (e.g., employment and parenting) at a younger age than for older adults.

Other studies have shown that previous traumatic experiences increase the risk of developing PTSD after a subsequent traumatic event (e.g., [26]). Similarly in this study, veterans with combat PTSD reported more cancer-related PTSS than other veterans. It should be noted that combat PTSD and cancer-related PTSD encompass the same symptoms but refer to different traumas. These veterans reported symptoms of re-experiencing and

avoidance related to their combat trauma, but they also endorsed cancer-specific re-experiencing and avoidance (e.g., intrusive thoughts about the diagnostic process, avoidance of medical appointments). This suggests that the presence of PTSD from a prior trauma may make individuals more susceptible to developing posttraumatic symptoms in the context of the cancer experience.

Although it did not reach statistical significance, it is notable that veterans who had experienced combat but did not endorse combat-related PTSD had the lowest cancer-related PTSS severity scores. This might suggest that combat experience without resulting posttraumatic stress symptomatology indicates resilience factors that may help with adjustment to future life stressors such as cancer diagnosis and treatment. Supporting this notion is that this group also had the highest level of social role satisfaction, suggesting that the resilience that helped them to cope with combat trauma may also have allowed them to successfully manage the effects of cancer and extend to a more positive view of their social role. Future research may elucidate specific factors that underlie this resilience and provide guidance on promoting these characteristics in survivors of cancer.

At the multivariate level, cancer-related PTSS were associated with lower levels of physical functioning and social role satisfaction, but combat PTSD and demographic and cancer-related variables were not significantly related to these quality of life outcomes. These findings underscore the considerable impact of PTSS in response to cancer on functioning in a variety of domains.

The results of this study have clinical implications for providers treating veterans diagnosed with cancer. For instance, as combat-related PTSD may increase the risk of developing PTSS related to cancer diagnosis and treatment, which in turn may contribute to negative quality of life, a thorough assessment should include information about prior combat exposure and related PTSD symptoms to identify these potential risk factors. The PC-PTSD has been recommended to screen for PTSD symptomatology in primary care [27], and may be applied in oncology settings as well. As the experience of cancer diagnosis and treatment might elicit reminders of traumatic experiences during combat and exacerbate posttraumatic stress symptomatology, veterans who suffer from increased emotional distress during the cancer experience may be targeted for treatment of both combat-related and cancer-related PTSD. Practitioners can find resources regarding treatment for combat and non-combat PTSD through the website of the National Center for PTSD (www.ptsd.va.gov). Additionally, as younger age places individuals at risk for more significant mental health symptoms as a result of the cancer experience, providers should be attuned to this when working with younger patients and provide appropriate mental health referrals as necessary.

Several limitations to this study should be noted. We used self-report rating scales to assess likely combat-related and cancer-related PTSS rather than a structured interview, which may provide more accurate diagnostic information. We chose to use the PCL because it is a well-validated tool for assessing PTSD in many populations, but further work is needed to optimize its sensitivity and specificity for cancer-related PTSD. Furthermore, although participants were asked to refer to combat and cancer separately during assessment of PTSD symptomatology, it would likely be difficult for them to precisely distinguish the etiology of some symptoms. Unfortunately, our data did not include information about prior-resolved PTSD symptomatology, which prevented examination of this factor on cancer-related PTSS and functioning. Furthermore, individuals with significant PTSD symptomatology may have been more likely to decline participation. Although our study was unique in its examination of understudied cancer types, these results might not apply to other types of cancer. Additionally, findings within this older, primarily Caucasian male sample may not generalize to a more heterogeneous population.

Results of this study highlight the unique contributions of combat experience and combat-related PTSD in veterans' adjustment to cancer diagnosis and treatment. Clinicians treating veteran cancer survivors should be mindful of these risks and resilience factors and consider screening for potential cancer-related PTSD, particularly in the presence

of factors such as combat PTSD and younger age. It is important to note that although combat PTSD is a risk factor for cancer-related PTSS, it was the cancer-related PTSS that was associated with poorer outcomes including physical and social role functioning. The identification and treatment of PTSD is an important aspect of survivorship care [28] and could contribute to more successful recovery from the cancer experience, as well as improving overall functioning outcomes.

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Conflict of interest

The authors have no conflict of interest relating to this study or this manuscript. This manuscript has not been published elsewhere and has not been submitted simultaneously for publication elsewhere.

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