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POSTTRAUMATIC STRESS DISORDER (PTSD) IN SURVIVORS OF HODGKIN'S LYMPHOMA (HL): PREVALENCE OF PTSD AND PARTIAL-PTSD COMPARED TO SIBLING CONTROLS

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Abstract

Objectives—Studies of PTSD document a significant proportion of cancer survivors reporting severe posttraumatic stress (PTS) symptoms, even when they do not meet full diagnostic criteria. However, few studies have directly examined the clinical significance of these “partial-PTSD” symptoms in survivors. This study aimed to investigate the prevalence of PTSD symptoms in a cohort of long-term survivors of HL, and to explore the clinical relevance of the partial-PTSD phenomenon by assessing impairment of function secondary to sub-threshold symptomatology.

Methods—The Posttraumatic Diagnostic Scale (PDS), was completed by 105 HL survivors and 101 sibling controls. Survivors age at time of participation ranged from 24–71 years, age at time of diagnosis ranged from 6–61 years, and the median time since diagnosis was 16 years (range = 7 – 34).

Results—PTSD prevalence was not significantly higher in HL survivors (13%) compared to sibling controls (6.9%, $p = .098$). However, a significantly larger proportion of survivors (35.2%) met criteria for partial-PTSD compared to siblings (17.8%, $p = .004$). Moreover, the majority of the survivors with partial-PTSD (86.5%) reported experiencing some functional impairment related to these PTS symptoms.

Conclusions—A significant number of HL survivors experience PTS symptoms severe enough to result in functional impairment. These findings underscore the importance of future research detailing the psychological and functional outcomes in survivors with partial-PTSD, and of careful clinical practice that assesses for functional impairment secondary to partial-PTSD symptomatology, in male and female survivors, even years after completion of therapy.

Keywords

Hodgkin's Lymphoma; Long-Term Survivors; Posttraumatic Stress; Survey; Cancer; Oncology

A diagnosis of cancer is a universally stressful event, and studies on the impact of cancer on psychological well-being have described common challenges experienced during treatment and in the survivorship period.[1–3] While it is recognized that for a number of cancer survivors psychological late-effects may persist even years after treatment completion, it remains unclear how commonly these late-effects take the form of Posttraumatic Stress

Disorder (PTSD), and how applicable this construct is for capturing the psychological experience of cancer survivors. PTSD is a psychiatric diagnosis characterized by the development of re-experiencing, avoidance, and increased arousal symptoms following exposure to a traumatic event.[4]

For over a decade, researchers have conducted empirical studies to understand the experience of cancer survivors who report symptoms consistent with PTSD. The results of these efforts have been inconsistent with wide variations in prevalence rates ranging from 3–32%, variability likely due to differences in sample characteristics, definitions and diagnostic tools across studies.[5, 6] In the adult cancer literature, most of the studies on PTSD have been conducted with survivors of breast cancer [7–15] making it difficult to generalize to males and to survivors of other diseases. In both the pediatric and adult cancer literatures, investigators interested in understanding the specific effects of cancer on the development of PTSD have tended to ask study participants to report only on the extent to which cancer has caused later PTSD symptoms, making it difficult to quantify the effects of other traumatic events or to even determine if the cancer itself was perceived as traumatic by the survivor [5, 6, 16, 17]. In addition, not all studies have included an adequate comparison group. [5, 6]

Conceptually, most experts consider a cancer diagnosis to be a stressor capable of initiating the development of PTSD, a position reflected in current diagnostic criteria that include life-threatening illnesses as qualifying stressors for PTSD.[4, 6, 18] Despite this, some experts argue that cancer is too variable and complex an experience to meet criteria as a single stressor consistent with the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) standards,[4] and that the cancer experience is too different from other stressors such as combat or rape to be properly included in the PTSD criteria as it was originally intended.[5] Of relevance to this debate is the fact that the number of cancer survivors meeting diagnostic criteria for PTSD is often reported to be low.[5, 7–9, 16, 17, 19, 20] Some of these same studies, however, document a significant proportion of survivors who report severe PTSD symptoms even when they do not meet full diagnostic criteria. [7–9, 21, 22] To date, few studies have directly examined the clinical significance of these “partial-PTSD” symptoms making it difficult to determine how significantly they affect survivors’ emotional well-being. As studies explore the important question of understanding partial-PTSD in survivors, we believe this is a key question that can be addressed by directly assessing the functional impairment associated with these sub-threshold symptoms.

In the present study, we attempt to contribute to the clarification of these controversial questions by addressing several issues. First, we investigate symptoms of PTSD in a cohort of long-term survivors of Hodgkin’s Lymphoma (HL), a cancer diagnosis not commonly reflected in previous PTSD research. Because HL is diagnosed at different ages, is highly curable even in advanced stages, and is diagnosed in both sexes, HL survivors represent a particularly diverse group of cancer survivors with regard to age at diagnosis, gender and intensity of treatment. Second, we compare the prevalence of PTSD in these HL survivors to a cancer-free group, namely a group of cancer-free siblings of the HL survivors recruited to the study. Finally, we address the question of partial-PTSD as a clinically relevant construct for cancer survivors, by determining if partial-PTSD is present at a significantly higher rate in survivors than in cancer-free siblings, and by assessing the number of HL survivors who experience impairment of function secondary to partial-PTSD symptomatology. We hypothesized that: 1) HL survivors will report a higher prevalence of PTSD, and partial-PTSD, than their cancer-free siblings, 2) higher rates of PTSD and partial-PTSD will be found in both male and female survivors compared to cancer-free siblings, and 3) partial-PTSD will be associated with significant impairment of functioning supporting the clinical relevance of partial-PTSD in cancer survivors.

METHODS

Participants

Participants were selected from a previously established cohort of HL survivors and their siblings who had participated in a long-term follow-up study of individuals treated for HL (LTFS). Survivors eligible for the LTFS were originally identified from the Joint Center for Radiation Therapy (JCRT), which provided radiation oncology treatment for four Harvard-affiliated hospitals in the Boston area. The eligibility criteria for the LTFS were diagnosis between 1969 and 1997, and a minimum of 5 years survival following treatment completion. Siblings were selected by asking each survivor to nominate their sibling who was closest in age and gender who had not been previously diagnosed with cancer (for further information on the LTFS cohort, please refer to Ng, et al., 2005 [23]). From this LTFS cohort we selected randomly 150 HL survivors and all 221 siblings to participate in a PTSD survey study. Participants were first sent a recruitment letter and those who did not opt-out to the study received a mailed survey. Study methods were approved by the Institutional Review Board at the cancer center. Of the 150 survivors recruited, 38 did not respond, 2 were deceased, 3 opted-out, 2 returned incomplete surveys, and 105 returned complete surveys which were included in analyses (survivors' response rate: 105/148, 70.9%). Of the 221 siblings recruited, 66 did not respond, 30 opted-out, 5 were deceased, 13 were ineligible because of a cancer diagnosis, 1 had a conflict of interest, 2 were lost to follow-up, 3 returned an incomplete survey, and 101 returned a complete survey included in the analyses (siblings' response rate: 101/200, 50.5%). The final sample consisted of 105 survivors (52 men) and 101 siblings (47 men). The median age at time of participation was 43 years (range = 24–71) for survivors, and 42 years (range = 20–66) for siblings. The ethnic composition was predominantly White (98.5%), and the majority (92.3%) had completed at least some training after high-school. For the survivors, median age at time of diagnosis was 25 years (range = 6–61), and 82.9% of survivors were diagnosed at as adults (>18 years of age). Almost all survivors in the sample received radiation (96.2%), and 44.8% received chemotherapy. 13.3% had HL stage I, 60% had stage II A, 16.2% had stage II B, and 9.5% had stages III and IV. The median time since diagnosis to the time of participation was 16 years (range = 7 – 34). At the time of our study, 25.7% of survivors (28.8% of males and 22.6% of females) had experienced cancer relapse.

Measures

Demographic and Medical Information—Survivors and siblings' demographic data as well as data on the survivors' treatment (e.g., age at diagnosis, time since diagnosis, stage of disease, etc.) were obtained from the previously collected LTFS database. Stages of HL were grouped into: 1) stage I, 2) stage IIA, 3) stage IIB, and 4) stages III and IV. Items included in the PTSD survey inquired about any changes in general medical conditions and general health status, including information on cancer relapse for the survivors and new cancer diagnosis for the siblings.

Posttraumatic stress disorder—The Posttraumatic Diagnostic Scale (PDS)[24] was used to assess posttraumatic stress disorder and posttraumatic stress symptom (PTS) severity. The PDS is a self-report instrument where respondents report any exposure to traumatic events and current symptoms associated with past traumas. If more than one traumatic event is experienced, respondents complete the checklist with regard to the event associated with the most significant current distress. To determine if the event qualifies for a PTSD diagnosis, the PDS also inquires about immediate reaction to the event and time since the event. Respondents then rate on a 4-point scale the extent to which they currently experience each of 17 PTSD symptoms corresponding to symptoms of re-experiencing, avoidance and increased arousal used to diagnosis PTSD. In addition to having a close

correspondence to diagnostic criteria for PTSD, the PDS was selected because items included in the PDS inquire about functional impairment. Specifically, the PDS includes a 9-item rating list to evaluate how much PTSD symptoms have interfered with the respondents' lives (e.g., work, daily functioning, etc.) during the previous month. The PDS has shown internal consistency of $\alpha = .92$ for the overall PTSD scale, and good diagnostic agreement with the SCID as reflected in a kappa of .65, sensitivity of .89, and a specificity of .75.[24]

Following current DSM-IV-TR standards[4] and previously published PDS criteria[24] we used responses on the PDS to classify PTSD in any individual who reported: 1) The direct experience or witnessing of an event involving death, injury, or a threat to the physical integrity of oneself or another person (DSM-IV-TR criterion A1); 2) a response to the event involving intense fear, helplessness or horror (criterion A2); 3) the development of persistent post-traumatic stress (PTS) symptoms of least 1 month duration and causing clinically significant distress or functional impairment (criteria E & F); 4) the presence of PTSD symptom in three symptom clusters representing, re-experiencing of the traumatic event, persistent avoidance of stimuli associated with the traumatic event, and persistent symptoms of increased arousal (criteria B-D). Following previously published criteria for partial-PTSD,[7] we classified partial-PTSD in any individual who 1) reported criterion A1, and 2) whose symptoms included only two of the three symptom clusters (i.e., re-experiencing, avoidance, arousal).

Statistical Analyses

Descriptive statistics were conducted on demographic variables for the entire sample and for survivors and siblings separately. For all participants, the number of traumatic events and the type of traumatic events was calculated. Number of traumatic events was coded into four categories: a) no trauma reported, b) single trauma, c) 2 traumas, and d) 3 or more traumas. Differences in prevalence of PTSD partial-PTSD between the survivors and siblings were obtained using Fisher's Exact Tests, and these analyses were repeated separately by gender. All comparisons between survivors and siblings were conducted using survivors and siblings as independent groups and not as a paired analysis.

RESULTS

The number of traumatic events endorsed was calculated for the entire sample and for survivors and siblings separately (Table 1). For all participants, 15.5% (95% CI = 11.2–21.1%) reported having experienced no trauma, 29.1% (95% CI = 23.4–35.7) reported a single trauma, 24.8% (95% CI = 19.4–31.1%) reported 2 traumas, and 30.6% (95% CI = 24.7–37.2%) reported 3 traumas. The most frequently endorsed traumatic events experienced or witnessed by the entire cohort were life-threatening illness (61.2%, 95% CI = 54.4–67.6%) and serious accident (36.4%, 95% CI = 30.1–43.2%). Life-threatening illness was also the most frequently endorsed event when explored separately for survivors and siblings (Table 2). The PTSD symptom most frequently endorsed by the entire cohort was "Feeling emotionally upset when you were reminded of the traumatic event (for example, feeling scared, angry, sad, guilty, etc.)," (39.3%, 95% CI = 32.9–46.1%). These data were also examined for survivors and siblings separately with similar results (Table 3). Of note, 12.4% of the survivors did not endorse having had a life-threatening illness as a traumatic event. Survivors who did not list having experienced a life-threatening illness as a traumatic event ($n = 13$) were not significantly different from survivors who reported having experienced a life-threatening illness ($n = 92$) in age ($p = .159$), gender ($p = .072$), age at diagnosis ($p = .511$), stage of disease ($p = .422$), radiation therapy received ($p = .415$), or chemotherapy received ($p = .768$). In addition, of the 92 survivors who endorsed having experienced an illness as a trauma 27 (29.4%, 95% CI = 21–39.3%) specified that life-

threatening illness was not the worst trauma ever experienced. For these 27 survivors their report of their worst experienced trauma was as follows: 5 serious accident; 4 natural disaster; 2 non-sexual assault by known person; 2 sexual assault by known person; 1 non-sexual assault by stranger; 1 combat; 3/ sexual contact when <18 years with someone at least 5 years or older; and 9 other traumas.

Regarding the prevalence of PTSD, 13% of the survivors (14 of 105; 95% CI = 8.1–21.1%) and 6.9% of the siblings (7 of 101; 95% CI = 3.4–13.6%) were classified as meeting criteria for PTSD, though the difference in these proportions was not statistically significant ($p = .098$). When analyzed by gender, results were similar: in males 9.6% of survivors (5 of 52; 95% CI = 4.2–20.6%) and 8.5% of siblings (4 of 47; 95% CI = 3.4–19.9%) met PTSD criteria ($p = .565$). In females, however, the difference between the proportion of survivors and siblings who met criteria for PTSD approached statistical significance ($p = .057$), with 16.9% of survivors (9 of 53; 95% CI = 9.2–29.2%), and 5.5% of siblings (3 of 54; 95% CI = 1.9–15.1%) meeting criteria. The 14 survivors who met criteria for PTSD, reported the elapsed time since the experience of the trauma was as follows: 3–6 months for 1 survivor, 6 months to 3 years for 4 survivors, 3–5 years for 1 survivor and > 5 years for 7 survivors (1 survivor did not specify). All 14 survivors who met PTSD criteria endorsed “life-threatening illness” as a traumatic event, but only 8 (57.1%; 95% CI = 32.6–78.6) specified that a life-threatening illness, and specifically cancer, was the traumatic event that bothered them the most. The survivors who met criteria for PTSD but did not indicate that life-threatening illness/cancer was their most bothersome experience, specified the following events as most bothersome (some survivors specified more than one): acute respiratory distress syndrome for 1 survivor, physical abuse by brother for 1 survivor, car accident and mother dying of cancer for 1 survivor, double bypass CABG resulting from mantle radiation for 1 survivor, and sexual contact with family member for 1 survivor.

When analyses were performed for partial-PTSD, by contrast, a significantly larger proportion of survivors met this criterion compared to siblings. 35.2% of survivors (37 of 105; 95% CI = 26.8–44.8%) met the partial-PTSD criteria compared with 17.8% survivors (18 of 101; 95% CI = 11.6–26.4%), ($p = .004$). Similarly, when analyzed separately by gender a significantly larger proportion of male survivors (34.6%, CI = 23.2–48.2%) than male siblings (17%, 95% CI = 8.9–30.1%) and a higher proportion of female survivors (35%, 95% CI = 24.3–49.3%) than female siblings (18.5%, 95% CI = 10.4–30.8%) met criteria for partial-PTSD ($p = .04$ for both comparisons). A break-down of the specific traumatic events reported by survivors and siblings who met criteria for PTSD or partial-PTSD is included in Table 4.

To explore the impact of partial-PTSD on functioning, the proportion of survivors with partial-PTSD who reported impairment in at least one area of their life functioning was calculated. Of the 37 survivors who met criteria for partial-PTSD, 32 (86.5%; CI = 72.0–94.1%) reported these symptoms were associated with impairment in at least one area of their lives. The majority of these 32 survivors (27; 84%) reported impairment in 3 areas of functioning, while 2 reported impairment in 2 areas, and 3 reported impairment in a single area of functioning.

DISCUSSION

The majority of HL survivors in our study (87%) did not meet criteria for a PTSD diagnosis, and PTSD prevalence was not consistently higher in the HL survivors compared to sibling controls. While we expected a larger proportion of survivors to qualify for PTSD than siblings, we found only partial support for this hypothesis among females survivors who were three times more likely to meet PTSD criteria, a difference that approached statistical

significance ($p = .057$). The finding that only a moderate proportion of cancer survivors meet criteria for PTSD is consistent with results of previous studies that have examined the prevalence of PTSD using psychiatric diagnostic criteria.[5, 6] However, our results indicate that there may be gender differences in the development of PTSD, with female survivors potentially being more prone to develop PTSD after cancer than males. A greater vulnerability of women to the development of PTSD has been reported in the PTSD literature before,[25] but has not been adequately researched in previous studies of cancer survivors, many of which have enrolled only female participants.

Partial-PTSD was notably more prevalent than full PTSD in our survivor cohort (35.2% vs. 13.0%), and as hypothesized, partial-PTSD was significantly more prevalent in survivors compared to siblings. Our results showing increased prevalence of partial-PTSD in cancer survivors are consistent with previous reports [7, 9, 26] and also provide important new information about the relevance of partial-PTSD to men and to functional status of all survivors. First, the prevalence of partial-PTSD was higher in survivors than siblings regardless of gender. In fact, the prevalence of partial-PTSD in males and females was nearly identical (34.6% and 35.0%). This is an important finding, because it indicates that where a diagnosable case of PTSD may be more likely to occur after cancer in females only, cases of partial-PTSD occur equally in males and females. Second, we found that the majority of the survivors with partial-PTSD (86.5%) report they experience some functional impairment related to these sub-threshold symptoms, with the majority reporting impairment in multiple areas of function. This is also an important finding, because the clinical significance of partial-PTSD has not been well studied, and these results suggest that partial-PTSD has significant negative impact on survivors' across several areas of functioning. While additional research on the impact of partial-PTSD will need to examine psychological and functional outcomes in more depth, our finding that survivors with partial-PTSD experience their symptoms as disruptive suggests that partial-PTSD is a phenomenon that has a significant impact on survivor outcomes and quality-of-life.

Unlike many studies of posttraumatic stress which direct cancer survivors to reflect on their cancer and report on the extent to which it led to posttraumatic stress symptoms [5, 7–9, 11, 13, 26–30] survivors here were asked to report their lifetime exposure to traumatic events. This was done to provide consistent methods for both survivors and sibling controls, not to be directed to a particular type of trauma when reporting on posttraumatic stress symptoms, and to permit survivors to define for themselves what experiences they experienced as traumatic. Their responses show that the experiences of trauma in cancer survivors are complex and not easily predicted. For example, we found that 12.4 % of survivors did not report that having had a life-threatening illness was traumatic. Moreover, 30.5% of the survivors in our sample reported exposure to one traumatic event, but 62% reported multiple past traumas. This indicates that for many survivors, asking only about cancer related trauma may miss important aspects of their traumatic experience. The potential importance of non-cancer-related trauma in cancer survivors is further underscored by the fact that even among cancer survivors who met study criteria for PTSD, more than half reported that a non-cancer trauma was the trauma that bothered them the most. These findings are an important reminder that the effects of traumatic events on later functioning are complex, and that simplified conceptualizations that don't account for individual interpretations of these events, or the occurrence of multiple events will miss important aspects of survivors' experiences. For clinicians and researchers working with cancer survivors, these results underscore the need to attend to a broad range of potential traumatic events, and not to presume that a cancer is the always the most severe trauma, or even experienced as trauma at all by every survivor.

Findings from the study need to be interpreted in the light of limitations in the design and sample. First, the sample was limited to patients treated at a single medical facility, and its demographic characteristics were highly homogeneous (mostly White, and with higher levels of education), raising questions about generalizability to other populations. The sample was also relatively small, and while PTSD may be slightly more prevalent in survivors, especially females, the power of our study to detect this difference was limited. Finally the comparison group consisted of siblings of survivors, a cohort that may not be representative of the population of non-cancer patients at large. While sibling controls provide a comparison groups with similar social and demographic characteristics to the survivors, by virtue of having a sibling with a cancer history the sibling controls may respond differently to study measures. Although most of the HL survivors were adults at the time of their diagnosis, and many of their sibling may have had limited exposure to their illness, it is conceivable that at least some siblings may have been traumatized by the experience of a brother's or sister's cancer diagnosis. To the extent this is true, comparison siblings in the study may be more like survivors and less like the general population thus biasing comparisons between siblings and survivors toward the null. For that reason, reported lack of differences between the two groups should be interpreted with caution.

Notwithstanding these limitations, the study contributes important new information to our understanding of posttraumatic stress in cancer survivors. Our finding that the absolute level of PTSD in survivors is moderate, but the prevalence of partial PTSD is significantly higher replicates the results of previous studies, but extends them to the population of HL survivors. Moreover, these results demonstrate that partial-PTSD is not limited to one gender, or one cancer diagnosis, and may have clinical significance for many cancer survivors. In addition, by demonstrating that partial-PTSD is significantly more prevalent in a group of HL survivors many years after diagnosis (median = 16 years), the studies supports the view that posttraumatic stress symptoms can endure for many years after cancer treatment. While a long latency between the cancer diagnosis and subsequent symptoms could be surprising to some, it is consistent with what is known about recovery from traumatic events; namely that individuals whose stress symptoms do not abate within a short period of time after the traumatic experience tend to have long-lasting symptoms that do not improve without treatment [31, 32]

Unlike the PTSD diagnosis, which has been developed and refined over the past several decades, partial-PTSD has been only recently put forth as a clinical syndrome, and its significance or even the need for the category itself are not widely accepted. Our results support the clinical relevance of the partial-PTSD construct for cancer survivors. At a time when the PTSD diagnosis itself is being seriously reevaluated and significant revisions to the diagnostic criteria have been proposed,[33] these findings are important because they support the exploration of alternative classifications of post-traumatic symptoms in cancer survivors. A more comprehensive understanding of partial-PTSD and its psychological and functional implications for cancer survivors will require additional research. Future studies that follow the course of posttraumatic stress symptoms at different time periods post-diagnosis and treatment completion into long-term survivorship will be particularly useful for further understanding the origins of PTSD and partial-PTSD, and whether partial-PTSD it is best understood as a sub-threshold variant of PTSD, or if it may reflect a partial remission of full-PTSD in some survivors. Studies are still needed to determine what role medical late-effects of cancer treatments have in the development or maintenance of PTSD and partial-PTSD, and if they are a mediating factor explaining why some survivors have these posttraumatic stress symptoms so many years after completion of therapy. Furthermore, future research that includes survivors and controls from diverse backgrounds, and that focuses on the evaluation of clinical interventions for PTSD and partial-PTSD symptom management in adult survivors of cancer are still sorely needed. While we await

more information on the significance of partial-PTSD in cancer survivors, clinicians should be aware that both male and female cancer survivors may be at increased risk for posttraumatic stress symptoms many years after completion of therapy, and should carefully evaluate their functional significance even in survivors who do not meet criteria for a full PTSD diagnosis.

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Table 1

Number of Traumatic Events Reported

Number of traumatic events	All Subjects (n = 206) N (%)	Survivors (n = 105) N (%)	Siblings (n = 101) N (%)
No event	32 (15.5)	8 (7.6)	24 (23.8)
1 event	60 (29.1)	32 (30.5)	28 (27.7)
2 events	51 (24.8)	24 (22.9)	27 (26.7)
3 events	63 (30.6)	41 (39.1)	22 (21.8)

Table 2

Frequencies on Type of Traumatic Event Endorsement

Type of trauma	All Subjects (n = 206) N (%)	Survivors (n = 105) N (%)	Siblings (n = 101) N (%)
Serious accident	75 (36.4)	45 (42.9)	30 (29.7)
Natural disaster	51 (24.8)	29 (27.6)	22 (21.8)
Non-sexual assault by known person	19 (9.2)	7 (6.7)	12 (11.9)
Non-sexual assault by stranger	35 (17.0)	16 (15.2)	19 (18.8)
Sexual assault by known person	14 (6.8)	8 (7.6)	6 (5.9)
Sexual assault by stranger	10 (4.9)	3 (2.9)	7 (6.9)
Military combat	7 (3.4)	6 (5.7)	1 (1.0)
Sexual contact when minor with person 5 years older	14 (6.8)	9 (8.6)	5 (5.0)
Imprisonment	2 (1.0)	0	2 (2.0)
Torture	0	0	0
Life-threatening illness	126 (61.2)	92 (87.6)	34 (33.7)
Other*	53 (25.7)	24 (22.9)	29 (28.7)

*“Other” traumas specifically included (quoted directly from participants): double bypass surgery, loss of baby (stillborn), loss of parent, loss of vision, death, emotional abuse by father, growing up with alcoholic parent, watch 3 family members die.

Table 3

Frequencies on Posttraumatic Stress Symptom Endorsement

Symptom reported	All Subjects (n = 206) N (%)	Survivors (n = 105) N (%)	Siblings (n = 101) N (%)
Upsetting thoughts or images of the event	58 (28.2)	38 (36.2)	20 (19.8)
Bad dreams or nightmares about the event	23 (11.2)	11 (10.5)	12 (11.9)
Reliving the event	31 (15.0)	18 (17.1)	13 (12.9)
Feeling upset when reminded of the event	81 (39.3)	50 (47.6)	31 (30.7)
Physical reactions when reminded of the event	32 (15.5)	19 (18.1)	13 (12.9)
Avoiding thinking/talking about the event	47 (22.8)	31 (29.5)	16 (15.8)
Avoiding activities, people & places	29 (14.1)	18 (17.1)	11 (10.9)
Not remembering part of the event	20 (9.7)	10 (9.5)	10 (9.9)
Less interest in activities	33 (16.0)	22 (21.0)	11 (10.9)
Distant/cut-off from people	39 (18.9)	26 (24.8)	13 (12.9)
Feeling emotionally numb	27 (13.1)	18 (17.1)	9 (8.9)
Feeling future plans won't come true	57 (27.7)	42 (40.0)	15 (14.9)
Trouble falling/staying asleep	55 (26.7)	39 (37.1)	16 (15.8)
Feeling irritable	50 (24.3)	32 (30.5)	18 (17.8)
Trouble concentrating	52 (25.2)	36 (34.3)	16 (15.8)
Overly alert	35 (17.0)	21 (20.0)	14 (13.9)
Feeling jumpy or easily startled	37 (18.0)	21 (20.0)	16 (15.8)

Table 4

Participants with PTSD or Partial-PTSD and Traumas Reported by Cohort and Gender

Type of trauma	Survivors		Siblings	
	Males (n = 18) N(%)	Females (n = 19) N(%)	Males (n = 8) N(%)	Females (n = 10) N(%)
Serious accident	10 (55.6)	8 (42.1)	3 (37.5)	2 (20)
Natural disaster	8 (44.4)	4 (21.1)	3 (37.5)	4 (40)
Non-sexual assault by known person	3 (16.7)	2 (10.5)	2 (25.0)	2 (20)
Non-sexual assault by stranger	8 (44.4)	3 (15.8)	3 (37.5)	2 (20)
Sexual assault by known person	1 (5.6)	4 (21.1)	2 (25)	2 (20)
Sexual assault by stranger	1 (5.6)	1 (5.3)	1 (12.5)	1 (10)
Military combat	2 (11.1)	1 (5.3)	0	0
Sexual contact when minor with person 5 years older	2 (11.1)	2 (10.5)	1 (12.5)	0
Imprisonment	0	0	0	0
Torture	0	0	0	0
Life-threatening illness	18 (100)	18 (94.7)	5 (62.5)	5 (50)
Other	6 (33.3)	13 (31.6)	7 (87.5)	5 (50)