Symptoms of Posttraumatic Stress in Young Adult Survivors of Childhood Cancer

By Wendy L. Hobbie, Margaret Stuber, Kathleen Meeske, Kathryn Wissler, Mary T. Rourke, Kathy Ruccione, Andrea Hinkle, and Anne E. Kazak

Purpose: This study assessed the prevalence of posttraumatic stress symptoms in young adult survivors of childhood cancer and the association of posttraumatic stress with anxiety, adjustment, perceptions of illness and treatment, and medical data extracted from oncology records.

Patients and Methods: Seventy-eight young adults (ages 18 to 40 years) who had been treated for childhood cancer completed questionnaires and psychiatric interviews assessing posttraumatic stress, anxiety, perceptions of their illness and treatment, and symptoms of psychologic distress. Data on treatment intensity and severity of medical late effects were collected via chart review.

Results: Of the patient sample, 20.5% met American Psychiatric Association Diagnostic and Statistical Manual criteria for posttraumatic stress disorder (PTSD) at some point since the end of their treatment. Clinically significant levels of intrusive (9%) and avoidant (16.7%) symptoms were reported. Participants also reported elevated state and trait anxiety. Participants with PTSD reported higher perceived current life threat, more intense treatment histories, and higher (and clinically significant) levels of psychologic distress than those who did not have PTSD.

Conclusion: One-fifth of this sample of young adult survivors of childhood cancer met criteria for a diagnosis of PTSD, with clinically significant symptoms of intrusion and avoidance reported. As in other samples, PTSD in young adult survivors was associated with anxiety and other psychologic distress. Survivors' perceptions of treatment and its effects were more highly associated with posttraumatic stress than were more objective medical data. The data suggest that cancer-related posttraumatic stress may emerge in young adulthood and may affect the achievement of developmental milestones and orientation toward health care.

J Clin Oncol 18:4060-4066. © *2000 by American Society of Clinical Oncology.*

AS THE NUMBER of survivors of childhood cancer increases, attention to survivors' psychosocial adjustment becomes increasingly important. Studies in the 1980s and early 1990s described child and adolescent survivors as generally well adjusted but showed that a subset had ongoing difficulties that could impair functioning.[1] Much less is known about survivors as they enter adulthood and the longer term course of psychologic adjustment. In this article, we apply a framework that has been useful in understanding adjustment to cancer survival, that of posttraumatic stress to young adults who had cancer when they were children or adolescents.

Although more recently applied to illness, posttraumatic stress disorder (PTSD) has long been recognized as postwar phenomena that emerged months to years after combat experience. A cluster of symptoms (eg, re-experiencing the traumatic event, feeling psychologically numb, avoiding reminders of the event, and reporting physiologic arousal) is the hallmark of PTSD. The disorder has been shown to affect children as well as adults and to result from many types of trauma.[2]

After significant avoidance behaviors and heightened arousal were observed in individuals with cancer,[3,4] cancer patients were included in the field trials for the fourth edition of the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM-IV).[5] The results of these trials revealed support for posttraumatic stress in adults and adolescents with cancer and for mothers of the pediatric patients.[6-8] Consequently, "learning that one/one's child has a life threatening disease" was included in the DSM-IV as an event sufficiently traumatic to precipitate PTSD.[5]

The framework of posttraumatic stress in understanding long-term childhood cancer survivors makes sense, given the potentially traumatic nature of the cancer experience. Treatment includes many painful, invasive procedures. Frequent hospitalization, separations from family and friends, and fear of the unknown further may compound these

extremely stressful experiences. Once treatment is completed, infertility, growth problems, cardiac dysfunction, and cognitive changes can be reminders of the previous traumatic event or may signal possible future medical problems.[9]

Early clinical observations and studies identified posttraumatic stress in childhood cancer,[10,11] and subsequent research documented posttraumatic stress in 6.2% to 25% of mothers of childhood cancer survivors.[8,12,13] As part of a larger study of 8- to 19-year-old survivors of childhood cancer and their parents, we administered structured psychiatric interviews to 66 mother-survivor pairs and found that 4.5% of survivors and 10.9% of mothers met criteria for a diagnosis of PTSD.[12,14] These rates of posttraumatic stress among mothers and fathers of survivors were significantly higher than those of a comparison group.

The childhood cancer survivors did not differ significantly from never-ill comparison children in the overall frequency of posttraumatic stress.[14] Some level of posttraumatic stress was present in the survivors, however, and these symptoms were related to other forms of psychologic distress and to some treatment variables. Specifically, children and adolescents who were characteristically anxious (ie, had higher trait anxiety) reported increased levels of posttraumatic stress than children who were not anxious.[14] In addition, survivors' perceptions of treatment intensity and life threat were predictive of posttraumatic stress, whereas more objective ratings made by health care providers were not significantly associated with posttraumatic stress.[15,16] In our sample, age was significantly inversely correlated with psychologic symptoms in the survivors, suggesting that, at least in the 12 to 18–year age span, there may be a developmental component to the emergence, or perhaps the reporting, of posttraumatic stress in childhood cancer survivors. Indeed, our clinical impression is that children's and adolescents' self-ratings reflect an underreporting of symptoms and not necessarily an absence of symptoms.

Because little research has focused on young adults, it is unclear whether prior findings extend to survivors as they reach their young adult years. There are several reasons to expect that the experience of young adulthood might potentiate reactions to a personal history of childhood cancer that differ from those evident in earlier developmental periods. Young adulthood is a time of increased vulnerability to stress and presents cancer survivors with major developmental challenges above and beyond those faced by other young people. For example, negotiating interpersonal relationships (including intimacy and forming families), as well as educational and employment decisions and achievements, often requires a focus, perhaps for the first time, on the medical, social, cognitive, or psychologic effects of cancer treatment. Therefore, survivors of childhood cancer may be at risk for increased distress and difficulty in facing these challenges and making the necessary transitions into adulthood. Their maturational process must include integrating their unusual childhood experiences and coping with potential late effects of treatment. Whether this integration leads to new symptoms or simply to the recognition and acceptance of symptoms that have been underreported in the more protected adolescent years, the rate of report would still be expected to increase.

The goal of this study was to explore posttraumatic stress in a sample of 18- to 40-year-old survivors of childhood cancer. Based on the developmental challenges and accomplishments typical of young adulthood, we predicted that young adult survivors would report clinically significant symptoms of posttraumatic stress and that these symptoms would be significantly higher than those reported by younger survivors in our previous studies. We also expected that posttraumatic stress would be positively associated with the survivors' perceived treatment intensity and life threat but would not be associated with more objective ratings of treatment intensity and medical sequelae, as in our earlier studies with younger survivors and their parents. Finally, we predicted that survivors who met criteria for a diagnosis of PTSD would report higher levels of other psychologic distress and that posttraumatic stress would be associated with trait anxiety.

PATIENTS AND METHODS

Participants

English-speaking childhood cancer survivors who were at least 18 months off therapy and between the ages of 18 and 40 years were recruited from two teaching hospitals in urban areas on the East (site 1) and West (site 2) Coasts of the United States. A total of 234 survivors (70 from site 1 and 164 from site 2) were identified through tumor registries. Thirty percent (n = 21) of eligible patients at site 1 and 30.5% (n = 50) at site 2 were lost to follow-up and could not be contacted. Therefore, we were able to contact 49 eligible patients at site 1 and 114 at site 2; the refusal rate at each site was 34.6% (n = 17) and 28.1% (n = 32), respectively. Patients who met medical criteria for the study but were ineligible (eg, non–English speaking or lived out of region) totaled 10.2% (n = 5) and 27.2% (n = 31) for sites 1 and 2, respectively. Therefore, the final sample included 55.2% (n = 27) of the eligible survivors who could be contacted from site 1 and 44.7% (n = 51) of the eligible survivors who would be contacted at site 2, resulting in a total of 78 participants. Distribution of diagnoses was as follows: acute lymphoblastic leukemia (n = 29, 37.2%); Hodgkin's disease (n = 13, 16.7%); sarcomas (n = 12, 15.4%); Wilms' tumor (n = 6, 7.7%); non-Hodgkin's lymphoma (n = 4, 5.1%); acute myelocytic leukemia (n = 3, 3.8%); bone tumors (n = 3, 3.8%); retinoblastoma (n = 1, 1%); and other (n = 7, 9%).

The sample consisted of an equal number of males and females. The mean age at time of study was 25 years (SD = 4.4 years), and mean number of years since the completion of treatment was 11.0 (SD = 5.5 years). Mean age at diagnosis was 11.7 years (SD = 4.7 years). The ethnic background of participants was as follows: white (n = 47, 60.3%); Hispanic (n = 23, 29.5%); African-American (n = 3, 3.8%); Asian (n = 3, 3.8%); and other (n = 2, 2.6%). There were slight demographic differences between the two samples, with the larger West Coast sample containing a higher number of different diagnoses and a higher representation on Hispanic participants then the East Coast sample.

Procedure

Letters inviting participation in a study of the psychosocial impact of having childhood cancer were sent to all eligible patients. Postcards allowing patients to decline further contact were included. Follow-up phone calls were made to determine interest and schedule participation.

Participants were interviewed by masters or doctoral level clinicians trained in the administration of the measures. The study was approved by the institutional review board at each site. Medical data on intensity of treatment and severity of medical late effects were collected by chart review for participants and nonparticipants (those who met criteria but did not participate in the study). There were no differences for intensity of treatment between participants and nonparticipants. However, participants had an even distribution across the three categories of medical late effects, whereas nonparticipants were overrepresented in the mild category (χ^2 (2) = 6.59, $P < .05$).

Measures

Impact of Event Scale (IES). The IES assesses posttraumatic stress,[17] with 15 items rated on a four-point scale for frequency of occurrence during the previous week. There are two subscales: Intrusion and Avoidance. The IES has high internal consistency and test-retest reliability; it discriminates between different populations and symptom levels,[18] in medical and nonmedical samples.[19]

Posttraumatic Stress Disorder Reaction Index (PTSD-RI). The PTSD-RI is a 20-item self-report questionnaire that assesses posttraumatic stress (intrusion, avoidance, and arousal).[20,21] Frequency of occurrence of each item is endorsed on a four-point scale. Scores 25 to 39 are considered moderate, with scores over 40 considered severe. Data indicate a strong association of empirically derived categories of symptom severity with clinical diagnoses of PTSD based on diagnostic measures.[22]

State-Trait Anxiety Inventory (STAI). The STAI is a 40-item self-report scale assessing current (state) and personality (trait) anxiety.[23] The STAI has high internal consistency and adequate construct and discriminative validity across diverse samples.[24]

Structured Clinical Interview for DSM III (SCID). The SCID[25] is a well-established semi-structured interview used to establish diagnoses consistent with the American Psychiatric Association DSM-IV.[5] The PTSD module was administered to each participant by one of a team of interviewers. All interviewers were master's level nurses or graduate students who had completed training in SCID administration and scoring. Training consisted of four didactic and experiential training meetings, supplemented by weekly supervision on scoring issues. SCIDs were administered during the same appointment at which participants completed all other study questionnaires. Therefore, interviewers had no formal information about a participant's reported symptoms before the interview. All SCIDs were administered according to standard administration procedures; questions parallel to each DSM-IV symptom of PTSD were read to each participant, and interviewers rated each symptom as present or absent based on the participant's response. Follow-up questions to clarify responses were formulated as appropriate, following standardized guidelines. At the conclusion of each interview, interviewers counted symptom endorsements and gave a diagnosis of PTSD to all individuals who met DSM-IV criteria. The SCID has been demonstrated to have good reliability and validity.[25] Although interrater reliability of the SCID with the current sample has not been assessed, prior reliability with our research interviewers with similar samples has been strong, with an overall Cohen's kappa of 86.[14] The SCID was used in our earlier studies to assess adult (ie, parent) symptoms of posttraumatic stress. Because this measure is not appropriate for use with children, a comparable semi-structured interview, also derived from DSM-IV criteria, was used in our earlier study to estimate rates of PTSD in child and adolescent survivors.

The Assessment of Life Threat and Treatment Intensity Questionnaire (ALTTIQ). The ALTTIQ is comprised of seven questions asking about the extent to which cancer and its treatment are believed to be intense and life threatening.[16] Perception of current and past life threat and treatment intensity were assessed. Based on our past research, two items tapping the past (I could have died from my cancer.) and the present (I could still die from my cancer.) were used as indices of perceived life threat, and two other items (I had a lot of cancer treatment; and my cancer treatment was hard for me.) were used to measure perceived treatment intensity.[16]

Brief Symptom Inventory (BSI). The BSI[26] is a 53-item self-report measure assessing the presence and intensity of symptoms related to psychopathology. The BSI has good reliability and validity.[27] The following seven subscales were used: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, and phobic anxiety.

Intensity of Treatment Rating. Intensity of treatment ratings were based on chart review. Information regarding each participant's treatment was abstracted from the medical chart by master's level nurses and graduate student research assistants who had been trained to identify relevant data. The abstracted chart data were then rated by a pediatric oncologist and a pediatric oncology nurse practitioner. Patient names were excluded from the abstracted information to allow medical ratings to be blind to patient identity. The rating categories were as follows: 1 (mild) = surgery only and/or 6 months of chemotherapy only; 2 (moderate) = treatment for low- or average-risk cancers according to Children's Cancer Group and Pediatric Oncology Group treatment protocol; 3 (severe) = bone marrow transplantation, high-risk Children's Cancer Group and protocols. The kappa for interrater reliability was 1.0. Ratings showed that 74.4% of patients (n = 58) received moderately intensive cancer treatments, a small number received mildly intensive treatments (5.1%, n = 4), and the remaining 19.2% (n = 15) were treated on protocols classified as severe intensity.

Medical sequelae rating. Medical late effects of treatment were also evaluated by reviewing abstracted chart data that were subsequently scored on a three-point scale by the same pediatric oncologist and pediatric oncology nurse practitioner, again blind to the patient's identity. Scores were defined as follows: 1 (mild) = no limitations of activity and no special medical attention required; 2 (moderate) = mild restriction of activity, mild cosmetic changes, and some medical attention (eg, mild hearing loss, delayed sexual maturation and abnormally short stature [below 5th%]); 3 (severe) = significant restriction of daily activity and significant medical attention required (eg, seizures and cardiopulmonary problems). The kappa for interrater reliability

Table 1. Mean ± SD for Measures of Posttraumatic Stress in the Current Young Adult Sample Compared With Younger Children and Mothers

	Scores		
Measure	Young Adult Survivors (n = 78)	Childhood Survivors (n = 130)	Mothers of Pediatric Survivors (n = 130)
Reaction Index	21.28 ± 12.19	13.39 ± 11.13*	23.14 ± 13.58
Anxiety, state	42.86 ± 8.53	NA	36.50 ± 12.40*
Anxiety, trait	44.49 ± 4.48	NA	38.51 ± 10.17*
IES			
Intrusion	8.42 ± 8.10	5.13 ± 6.31†	8.24 ± 8.31
Avoidance	10.13 ± 9.81	6.80 ± 7.80‡	7.66 ± 8.91
Total	18.55 ± 16.34	11.92 ± 12.49†	15.90 ± 15.83

NOTE. Footnote symbols (*,†,‡) indicate figures that are significantly different from young adult means.
Abbreviation: NA, not available.
*P < .001.
†P < .01.
‡P < .05.

was .96. Ratings were relatively evenly distributed, with 35.9% of patients categorized as mild, 29.5% (n = 23) as moderate, and 32.1% (n = 25) as severe.

RESULTS

The prediction of elevated levels of posttraumatic stress was supported. Sixteen (20.5%) of 78 participants met DSM-IV criteria for a diagnosis of PTSD on the SCID at some point since their cancer treatment had ended. On the IES, 9% of the sample (n = 7) scored in the clinically significant range on the Intrusion scale, and 16.7% (n = 13) were in the clinically significant range on the Avoidance scale. On the PTSD-RI, 24.4% of patients (n = 19) were in the moderate range, and 7.7% (n = 6) were in the severe range of symptom severity.

Scores on all measures of posttraumatic stress symptoms for this sample were compared with data from younger survivors and their mothers in our prior study to determine potential developmental differences (Table 1).[28] Supportive of our prediction, the young adult survivors had significantly higher scores on PTSD-RI and IES than child and adolescent cancer survivors (8 to 18 years) ($t(100) = 2.37$, $P < .02$; and $t(100) = 2.77$, $P < .01$ for the PTSD-RI and the IES, respectively). Their scores were similar to those of mothers in the earlier study. The 20.5% occurrence of PTSD in our young adult sample was also significantly higher than the 10.9% documented earlier in mothers and the 4.5% documented in child and adolescent survivors.[12,14]

The associations of perceived treatment intensity and life threat on the ALTTIQ with the PTSD-RI and the IES are listed in Table 2. The Spearman correlations are significant, offering support for the hypothesized association between subjective appraisal and symptoms of posttraumatic stress.

Table 2. Spearman Correlations Between Posttraumatic Stress (PTSD-RI, IES) and Perceptions of Treatment Intensity and Life Threat (ALTTIQ)

	Correlation		
	Perceived Treatment Intensity	Perceived Past Life Threat	Perceived Current Life Threat
PTSD-RI	.35*	.33*	.28†
IES Intrusive	.26†	.28†	.07
IES Avoidant	.12	.11	.09

*P < .01.
†P < .05.

In addition, young adult survivors who reported a lifetime history of PTSD on the SCID perceived their current life threat as significantly higher than those without PTSD (Mann-Whitney $U = -3.11$, $P < .01$). They also rated their treatment as more intense (Mann-Whitney $U = -1.62$, $P = < .05$). There was no difference between the participants with and without a diagnosis of PTSD in perception of previous life threat.

As predicted, there were no significant associations between ratings of treatment intensity and medical late effects derived from chart data and scores on the PTSD-RI and IES. Subjects who had or had not met criteria for PTSD on the SCID did not differ significantly with respect to ratings of treatment intensity and medical late effects.

On all scales of the BSI and on the state and trait scales of the STAI, young adult survivors reported scores that were significantly above normative values. In addition, an association between a diagnosis of PTSD and other psychologic symptoms was expected and confirmed. On the BSI, survivors with a diagnosis of PTSD endorsed significantly higher levels of symptoms on all scales (Table 3). On the STAI, there were no significant differences between survivors with and without PTSD on state anxiety ($t(72) = -1.25$, $P >$

Table 3. Mean ± SD on the BSI for Young Adult Survivors With and Without PTSD

	Scores	
	Survivors With PTSD (n = 16)	Survivors Without PTSD (n = 52)
Somatization	0.92 ± 0.60	0.41 ± 0.41*
Obsessive-compulsive	1.37 ± 0.96	0.71 ± 0.61†
Interpersonal sensitivity	1.28 ± 0.81	0.44 ± 0.53‡
Depression	1.26 ± 0.95	0.37 ± 0.47*
Anxiety	1.16 ± 0.79	0.43 ± 0.55‡
Hostility	1.24 ± 0.68	0.33 ± 0.43‡
Phobic anxiety	0.64 ± 0.60	0.25 ± 0.47*
Global severity index	1.13 ± 0.60	0.41 ± 0.41‡

*P < .01.
†P < .05.
‡P < .001.

.05), but survivors with PTSD did tend to have higher trait anxiety than those without PTSD ($t(71) = -1.84$, $P < .10$). Although this difference is marginally significant, with a larger sample size (and more individuals in the PTSD comparison group), this difference is expected to be more robust. In support of the prior association between trait anxiety and posttraumatic stress, trait anxiety was significantly associated with the PTSD-RI ($r = .37$, $P < .001$) and with IES Intrusion ($r = .35$, $P < .01$) and Avoidance ($r = .42$, $P < .001$) scores.

DISCUSSION

One-fifth of the young adult survivors of childhood cancer in our sample met criteria for a diagnosis of PTSD. This rate is a four-fold increase over levels of PTSD reported in our younger sample of survivors,[14] and is more similar to rates reported by adult survivors of cancer.[29] This documents a higher level of psychologic distress than has been reported in previous studies of young adult survivors[30-32] and supports the helpfulness of a posttraumatic stress framework in understanding long-term psychologic adjustment after cancer treatment. The data also support our previous findings in younger survivors and their families regarding the association of posttraumatic stress with anxiety and other psychologic distress. Finally, our earlier findings related to the importance of subjective appraisals of the illness and treatment were supported in this older cohort.

These findings make an important point: a significant portion of long-term survivors of childhood cancer will report re-experiencing, arousal, and avoidant symptoms that may in large part revolve around issues of health care and/or illness. These symptoms are associated with survivors' ongoing fears that their lives remain in danger. Events such as driving to the hospital, or smells associated with their treatment may be reminders potent enough to generate strong physical and emotional responses even more than 10 years after treatment. This is of clinical significance because such symptoms may have an influence on health care behaviors. For example, young adult survivors may be hypervigilant about physical symptoms. Alternatively, and perhaps of greater concern, they may avoid seeking medical care because it is a reminder of their experience.

Although our interview measure of posttraumatic stress documented PTSD at twice the rate evident in our earlier sample of mothers of survivors, the questionnaire measures documented levels of posttraumatic stress that were comparable with those documented earlier in mothers. Two possible explanations may account for this discrepancy in findings. First, whereas the SCID, our interview measure, aims to document cases of PTSD that meet all DSM-IV criteria, the questionnaire measures (IES and PTSD-RI) document only the experience of some symptoms of the disorder and not a diagnosis. Many survivors and mothers experienced some clinically significant levels of symptoms, regardless of whether or not they met full diagnostic criteria. Second, method variance across questionnaires and interviews methods could generate divergent information. For example, an interview may help participants frame their illness-specific experiences within the PTSD model, whereas responding to questionnaire items may not foster these connections as readily.

Our sample of young adult survivors who met diagnostic criteria for PTSD also demonstrated higher levels of other psychologic distress. This finding of risk is consistent with other research that has documented comorbidity between non–illness-related PTSD and affective disorders, anxiety disorders, somatization, substance abuse, and dissociative disorders.[33,34] In addition, our earlier work has documented links between trait anxiety and posttraumatic symptoms in child/adolescent survivors of cancer and their parents.[14] The specific association of trait anxiety with PTSD in our current sample confirms that our sample is similar to the earlier sample of mothers of cancer survivors and to samples of people experiencing PTSD after other traumas. Our earlier finding that trait anxiety predicts PTSD suggests that trait anxiety may not simply be a symptom of PTSD but may instead predispose people to experience the disorder after a trauma. This is a subtle but important distinction. Although PTSD is technically considered to be an anxiety disorder, the symptoms of anxiety and posttraumatic stress are not synonymous. It is important to disentangle the ways in which other primary anxiety disorders can be differentiated from the anxiety that is associated with PTSD. Replicating the predictive relationship between these two constructs is the next step in this process and is currently underway. Similar examinations of the relationship between posttraumatic stress and other psychologic symptoms could further illustrate the ways in which PTSD symptoms place survivors at risk for adjustment difficulties.

It is not clear why rates of PTSD in this sample were higher than those seen in younger childhood cancer survivors. Developmental trends may help to explain the expression of posttraumatic stress in young adulthood, rather than in childhood and adolescence. Developmentally young children and adolescents do not have a sense of their own mortality. Most younger survivors, including those with neurocognitive deficits, function in ways that seem grossly comparable with their age-mates; they attend school and participate in peer relationships. They have yet to realize the cost they may pay for cure (eg, infertility and cardiomyopathy) and remain somewhat insulated from the demands of young adulthood.[35]

Conversely, the young adult survivor must evolve from a protective childhood environment to face adult uncertainties (and possible limitations) as they assume some level of independence. Long-term effects of cancer and treatment come to bear in two ways. First, ongoing medical late effects may come to impact survivors and their families in new ways. Possible infertility, for example, becomes a more immediate concern, or neurocognitive deficits may make attending college, gaining full-time employment, or even living independently seem clearly impossible for the first time. Second, newly emerging late effects, in the form of cardiac impairment or second cancers, impose new and unforeseen limitations.

Although a lack of association between psychologic symptoms and the medical ratings of treatment intensity or extent of medical late effects is counter-intuitive, these findings are consistent with previous studies (Kazak et al, manuscript submitted for publication). Survivors who perceived that their life is currently threatened, however, reported statistically higher levels of posttraumatic stress than those who were more sanguine about life threat, regardless of their disease and treatment. The relationship between these perceptions and the experience of posttraumatic stress makes sense conceptually; a DSM-IV symptom of PTSD is the sense of a foreshortened future. It is possible that the inclusion of items tapping this symptom on several measures of posttraumatic stress may partially account for this observed correlation. The perception that treatment was intensive was also associated with more posttraumatic stress. That both perceptions about treatment and survivorship relate to posttraumatic stress suggests that the current life threat finding is not simply an artifact of the measures used. These findings have clear implications for the importance of assessing what survivors understand about their treatment and prognosis, as well as for providing targeted, accurate information on preventive health care within the context of routine long-term follow-up care.

Although an important minority of young adult survivors struggle with posttraumatic stress and other psychologic difficulties, more than three-quarters of our sample demonstrated no significant levels of psychosocial symptoms, highlighting the importance of a competence model when considering psychosocial challenges in the years during and after cancer treatment. Most responses to cancer are normal reactions to an unusually distressing life event, and most patients and their families draw upon a variety of resources to competently manage the challenge of a cancer diagnosis, treatment, and long-term effects.

An emphasis on competence, however, does not diminish the seriousness of symptoms. It is important to ask survivors to discuss their current beliefs related to their disease and its after-effects (eg, perceptions of risk and life threat). Although survivors' perceptions may contradict their medical history, the current findings indicate that discussions of disease recurrence, late effects, and current health status that accept survivors' beliefs are warranted. Survivors who are experiencing posttraumatic stress are also likely to be feeling anxious and to have other psychologic symptoms that may be affecting their well-being. Health care providers can support competence in patients (with and without posttraumatic stress) by discussing late effects honestly and by helping survivors to accept the uncontrollable aspects of their situations (eg, infertility or cardiac impairment) while emphasizing controllable or modifiable risk factors (eg, diet, lifestyle, or risk-taking behaviors).[35] This emphasis on normal development and the maintenance of wellness, contrary to a focus on problems, will support survivors' mastery of appropriate health behaviors. The importance of establishing a caring relationship with young adult survivors and maintaining heightened sensitivity to ways in which anxiety may impact the ability to absorb and use information remain key components of health care.

Although supportive of the occurrence of posttraumatic stress symptoms in young adult survivors of childhood cancer, these data are from a preliminary investigation. Although diverse in geographic and ethnic representation, the current sample was relatively small, necessitating replication with a larger sample. In addition, a large percentage of the individuals eligible for this study could not be located or refused to participate. It is possible that a significant proportion of those who terminated their relationship with their primary oncology center and those who refused participation did so because of avoidance characteristic of PTSD. Alternatively, it could be that the normal developmental demands of young adulthood (eg, moving away and leading busy lives) accounts for most of this unknown group.

In summary, the data presented indicate that a significant subset of young adult survivors of childhood cancer experience symptoms of posttraumatic stress and other psychologic difficulties. These findings offer important implications for ways in which physicians, nurses, and other health care practitioners can support the development of young adult survivors; assessing patient beliefs about their disease, treatment history, and current functioning is an important addition to regular health care visits. It is by attending to these issues that health care providers can alleviate ongoing cancer-related distress and promote competence.

REFERENCES

1. Kazak AE: Implications of survival: Pediatric oncology patients and their families, in Bearison DJ, Mulhern RK (eds): Pediatric Psychooncology: Psychological Perspectives on Children With Cancer. New York, NY, Oxford University Press, 1994, pp 171-192

2. Pynoos RS, Bremner JD, Charney DS, et al (eds): Posttraumatic Stress Disorder: A Clinical Review. Lutherville, MD, Sidran Press, 1994

3. Cella D, Pratt A, Holland J: Persistent anticipatory nausea, vomiting, and anxiety in cured Hodgkin's disease patients after completion of chemotherapy. Am J Psychiatry 143:641-643, 1986

4. Cella DF, Tross S: Psychological adjustment to survival from Hodgkin's disease. J Consult Clin Psychol 54:616-622, 1986

5. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders (ed 4). Washington, DC, American Psychiatric Association, 1994

6. Alter CL, Pelcovitz D, Axelrod A, et al: The identification of posttraumatic stress disorder in adult cancer survivors. Psychosomatics 37:137-143, 1996

7. Pelcovitz D, Goldenberg B, Kaplan S, et al: Posttraumatic stress disorder in mothers of pediatric cancer survivors. Psychosomatics 37:116-126, 1996

8. Pelcovitz D, Kaplan S: Disorders of extreme stress and PTSD in cancer survivors. Proc Ann Meet Intern Soc Trauma Stress Studies. Los Angeles, CA, November, 1992

9. Schwartz CL, Hobbie WL, Constine LS, et al (eds): Survivors of Childhood Cancer: Assessment and Management. Philadelphia, PA, Mosby, 1994

10. Nir Y: Posttraumatic stress disorder in children with cancer, in Eth S, Pynoos R (eds): Posttraumatic Stress Disorder in Children. Washington, DC, American Psychiatric Press, 1985, pp 123-132

11. Stuber M, Nader K, Yasuda P, et al: Stress responses after pediatric bone marrow transplantation: Preliminary results of a prospective longitudinal study. J Am Acad Child Adolesc Psychiatry 30:952-957, 1991

12. Kazak AE, Barakat L, Meeske K, et al: Posttraumatic stress, family functioning and social support in survivors of childhood leukemia and their mothers and fathers. J Consult Clin Psychol 65:120-129, 1997

13. Manne SL, DuHamel K, Gallelli K, et al: Posttraumatic stress disorder among mothers of pediatric cancer survivors: Diagnosis, comorbidity and utility of the PTSD Checklist as a screening instrument. J Pediatr Psychol 23:357-366, 1998

14. Barakat L, Kazak A, Meadows A, et al: Families surviving childhood cancer: A comparison of posttraumatic stress symptoms with families of healthy children. J Pediatr Psychol 22:843-859, 1997

15. Kazak AE, Stuber ML, Barakat LP, et al: Predicting posttraumatic stress symptoms in mothers and fathers of survivors of childhood cancer. J Am Acad Child Adolesc Psychiatry 37:823-831, 1998

16. Stuber ML, Kazak AE, Meeske K, et al: Predictors of posttraumatic stress symptoms in childhood cancer survivors. Pediatrics 100: 958-964, 1997

17. Horowitz MJ, Wilner N, Alvarez W: Impact of Events Scale: A measure of subjective stress. Psychosom Med 41:209-218, 1979

18. Schwardwald J, Solomon Z, Weisenberg M, et al: Validation of the impact of event scale for psychological sequelae of combat. J Consult Clin Psychooncol 55:251-256, 1987

19. Epping-Jordan J, Compas B, Howell D: Predictors of cancer progression in young adults men and women: Avoidance, intrusive thoughts and psychological symptoms. Health Psychol 13:539-547, 1994

20. Frederick C: Children traumatized by catastrophic situations, in Pynoos R (ed): Posttraumatic Stress Disorder in Children. Washington, DC, American Psychiatric Press, 1985, pp 71-99

21. Pynoos R, Frederick C, Nader K, et al: Life threat and posttraumatic stress in school age children. Arch Gen Psychiatry 44:1057-1063, 1998

22. Pynoos R, Goenjian A, Tashjian M, et al: Posttraumatic stress reaction in children after the 1988 Armenian earthquake. Br J Psychiatry 163:239-247, 1993

23. Spielberger CD: Manual for the State-Trait Anxiety Inventory (Form Y). Palo Alto, CA, Consulting Psychologist Press, 1983

24. Novy DM, Nelson DV, Goodwin J, et al: Psychometric comparability of the Stait-Trait Anxiety Inventory for different ethnic subpopulations. Psychol Assess 5:343-349, 1993

25. First M, Spitzer R, Gibbon M, et al: Structured Clinical Interview for DSMIV (Axis I Disorders): Nonpatient Edition. New York, NY, Biometrics Research Department, NY State Psychiatric Institute, 1995

26. Deragotis L, Melisaratos N: The brief symptom inventory (BSI): An introductory report. Psychol Med 13:594-605, 1983

27. Tennen H, Affleck G, Herxberger S: SCLR-90R, in Keyser DJ, Sweetland RC (eds): Test Critiques. Kansas City, MO, Test Corporation of America, 1984, pp 583-594

28. Kazak A: Posttraumatic distress in childhood cancer survivors and their parents. Med Pediatr Oncol 1:60-68, 1998 (suppl)

29. Androwkowski MA, Cordova MJ: Factors associated with posttraumatic symptoms following treatment for breast cancer: Test of the Anderson Model. J Trauma Stress 11:189-203, 1998

30. Eisner C, Haverman T: Long term social adjustment after treatment for childhood cancer. Arch Dis Child 70:60-77, 1994

31. Evans S, Radford M: Current lifestyle of young adults treated for cancer in childhood. Arch Dis Child 72:423-426, 1995

32. Tebbi CK, Petrilli AS, Richards ME: Adjustment to amputation among adolescent oncology patients. Am J Ped Hematol Oncol 11:276-280, 1989

33. Brady KT: Posttraumatic stress disorder and comorbidity: Recognizing the many faces of PTSD. J Clin Psychiatry 58:12-15, 1997

34. Noll R, Maclean W, Whitt K, et al: Behavioral adjustment and social functioning of long-term survivors of childhood leukemia: Parent and teacher reports. J Pediatr Psychol 22:827-841, 1997

35. Rourke M, Stuber M, Hobbie W, et al: Posttraumatic stress disorder: Understanding the psychosocial impact of surviving childhood cancer into young adulthood. J Pediatr Oncol Nurs 16:126-135, 1999