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Review article

Anxiety Among Adolescent Survivors of Pediatric Cancer

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ABSTRACT

Purpose: The purpose of this review was to synthesize current knowledge about anxiety among adolescent survivors of pediatric cancer and highlights areas for future research.
Methods: Systematic literature searches were conducted in five databases for articles published anytime before December 28, 2015. Manuscripts were reviewed by a team of six coders. Included manuscripts reported outcomes relevant to anxiety, worry, and post-traumatic stress in survivors of pediatric cancer (age at the time of study: 10–22 years) who were off treatment.
Results: Twenty-four articles met inclusion criteria. Included results were categorized into the following domains: post-traumatic stress, anxiety, cancer-related worry, and interventions. With the exception of post-traumatic stress, there was little research about anxiety in this population; however, studies generally indicated that adolescent survivors of pediatric cancer are at elevated risk for anxiety, post-traumatic stress symptoms, and cancer-related worry.
Conclusions: This review provides preliminary evidence that anxiety is a relevant, but understudied, psychosocial outcome for adolescent survivors of pediatric cancer. More research is needed to better understand the presentation of anxiety in this population, its effect on survivors' quality of life, and possible areas for intervention.

IMPLICATIONS AND CONTRIBUTION

This overview will establish a foundation for the implementation of anxiety screening and the development of evidence-based interventions to target anxiety and related symptoms in this population. Targeting these symptoms could prove to be useful in supporting psychosocial adjustment during adolescence and as these patients transition into adulthood.

Approximately, 10,380 children under the age of 15 years were diagnosed with cancer in 2016 [1], and around 5,000 adolescents aged 15–19 years are diagnosed with cancer annually [2]. Approximately, 85% of children and adolescents with cancer survive at least 5 years after diagnosis [3]. With growing numbers of pediatric and adolescent cancer survivors [3,4], it is crucial to investigate the long-term effects the cancer experience may have on psychosocial adjustment. It is particularly important to investigate psychosocial outcomes for adolescents who have survived cancer, as adolescence is a unique and important phase in psychological development [5,6] that represents a period of increased risk for adverse psychosocial

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Conflicts of Interest: The authors have no conflicts of interest to disclose.

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outcomes [7]. Despite a growing interest in the psychosocial outcomes of adolescent survivors of pediatric cancer, anxiety is understudied in this population, with few studies examining anxiety as a main outcome variable [8]. It is necessary to address this gap in the literature, as there is meta-analytic evidence from adult samples that anxiety is an important and prevalent psychosocial outcome among cancer survivors [9].

Previous research examining anxiety in adolescent survivors (e.g., [10–12]) has focused primarily on post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms (PTSS). These studies have indicated that survivors report significant PTSS, meeting diagnostic criteria for PTSD at similar rates as adolescents who have experienced other traumas. A large portion of survivors report PTSS, such as re-experiencing and arousal, and survivors' PTSS are significantly related to parental PTSS [10]. Given the documented prevalence of PTSS and the evidence that anxiety, in general, may be an important psychosocial outcome for adolescent cancer survivors, it is critical to examine the literature about anxiety in this population.

This article will review literature regarding psychosocial functioning among adolescent survivors of pediatric cancer and psychosocial interventions targeting this population with the aim of synthesizing current knowledge about anxiety and highlighting areas for future research. This review aims to identify research relating to anxiety both at clinical (as defined by any edition of the DSM to accommodate the recent reclassification of disorders in the DSM-5 [13]) and subclinical levels.

Methods

Search strategy

Systematic searches were conducted in five databases for articles published before December 28, 2015. Authors hypothesized that research in this area would be limited [8] and, therefore, chose not to set any limitations on the research publication date. The search was limited to human only, English language, and adolescents (depending on database, this term included ages 13–18 years or 13–19 years). The databases were MEDLINE (via PubMed), Embase, The Cochrane Library, Web of Science, and PsycINFO (via OVID). For PubMed, Embase, The Cochrane Library, and PsycINFO, controlled vocabulary and text words were used in the development of search strategies. The Web of Science database does not employ controlled terminology, so was searched using only text words. All results were combined in a bibliographic management tool (EndNote). Duplicates were eliminated.

For MeSH and keyword terms, see PubMed search strategy in Appendix A. Generally, the search strategy had three components and all concepts were linked together with the AND operator: (1) adolescent cancer survivor terms including neoplasms, cancers, adolescents, juveniles, children, survivors, and survivorship; (2) psychosocial intervention terms including psychotherapy, behavior, cognitive behavioral therapy, talk therapy, psycho-pharmacology, mindfulness, and social adjustment; and (3) anxiety terms including panic disorders, social phobias, PTSD, OCD, depressive disorders, fear, worry, and nervousness. Controlled vocabularies were searched for and included in the search strategy for the searches in PubMed, Embase, Cochrane, and PsycINFO. The Web of Science search combined the keywords of all three concepts only.

Alternate sources were searched for gray literature items to reduce publication bias: the Society for Research on Adolescence (http://www.s-r-a.org/), Society for Adolescent Health and Medicine (http://www.adolescenthealth.org/Home.aspx), and the International Society of Paediatric Oncology (http://www.siop-online.org/).

Eligibility criteria

Eligibility was based on the following predefined inclusion criteria:

Sample: The sample included adolescents, aged 10–22 years at the time of assessment, who had completed any treatment regimen before study recruitment for any cancer diagnosis at any age. We intended to include only studies with samples aged 13–19 years. However, many published studies include these participants in a subject pool with broader age categories. Therefore, an age range of 10–22 years was chosen as the inclusion criterion to avoid eliminating samples that consisted primarily of survivors falling in our target age range. This inclusion criterion is similar to that used in a systematic review of psychosocial interventions for adolescents with cancer [14]. International samples were included if the article was published in English.

Study Design: Quantitative, qualitative, mixed methods, descriptive studies, intervention studies, pilot studies, case studies, peer-reviewed journal articles, white papers, and epub ahead of print articles were included.

Outcome: Anxiety, common proxies for anxiety (e.g., worry and fear), and post-traumatic stress.

Exclusion: Articles not available in English, conference abstracts, review papers, commentaries, books, and unpublished dissertations.

Study selection

Titles and abstracts were independently reviewed by two members of the review team. Discrepancies ($n = 281$ of 3,009 titles and 178 of 789 abstracts) were discussed with the entire review team of six coders if resolution was not achieved within a review pair. Potentially relevant articles were reviewed in full by one member of the review team; articles determined to meet inclusion criteria were further reviewed by two authors (G.A.M. and C.G.S.). Three additional eligible studies were identified through reference review of the included studies.

Synthesis of findings

Anxiety-related information from included articles was organized into the following categories: post-traumatic stress, anxiety, cancer-specific worries, and interventions. When possible, effect sizes were calculated for significant results for ease of between-study comparisons.

Study quality was assessed using a modified version of the Downs and Black Quality Study checklist [15]. This modified version of the checklist has been used in a previously published systematic review [16]. See Appendix B for a list of quality indicators.

Results

Twenty-four articles met inclusion criteria. Please see PRISMA diagram for a summary of articles excluded at each phase of