

Associations Among Perceived Parent and Peer Support, Self-Esteem, and Cancer-Related Worry in Adolescent and Young Adult Cancer Survivors

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Purpose: Cancer-related worry is common among adolescent and young adult (AYA) cancer survivors, and is associated with adverse psychosocial outcomes. Thus, it is crucial to identify possible modifiable covariates of cancer-related worry to aid in developing targeted interventions. This study aimed to explore the cross-sectional associations between cancer-related worry and potential covariates (i.e., perceived parental support, perceived peer support, self-esteem).

Methods: One hundred fifty-two survivors between the ages of 15 and 25 who had been diagnosed with cancer between the ages of 14 and 21 completed the Inventory of Parent and Peer Attachment, the Rosenberg Self-Esteem Scale, the Self-Perception Profile for Adolescents, and a measure of cancer-related worry. Relationships among variables were assessed through structural equation modeling.

Results: The model showed good fit [$\chi^2(13) = 13.26, p = 0.43$; comparative fit index = 0.997; root mean square error of approximation = 0.01 (90% confidence interval = 0.00–0.08); standardized root mean square residual = 0.04]; however, not all associations were in expected directions. Higher perceived parent and peer support were each significantly associated with lower self-esteem, which, in turn, was significantly associated with higher cancer-related worry. There was no direct association between support variables and cancer-related worry.

Conclusion: These findings, which contradict existing theory about self-esteem development in healthy AYAs and prior research about the association between support and self-esteem in children and adolescents with cancer, suggest complex, and likely reciprocal, relationships among perceived support, cancer-related worry, and self-esteem in AYA cancer survivors. Support interventions involving peers with cancer and cognitive behavioral interventions targeting parent and peer relationships, self-esteem, and cancer-related worry may be beneficial in fostering AYA cancer survivors' psychosocial development.

Keywords: cancer-related worry, self-esteem, parent support, peer support

Introduction

APPROXIMATELY 80,000 ADOLESCENTS and young adults (AYAs) in the United States are diagnosed with cancer annually.¹ Fortunately, over two-thirds of AYAs with cancer have a diagnosis with a 5-year survival rate of at least 80%.² A cancer diagnosis during this period can disrupt psychosocial development when young people progress toward independence.^{3,4} AYAs with cancer are often unable to engage in these processes in the same manner as their peers due to physical, financial, and time constraints resulting from their disease and treatment. Thus, this group reports unique psychosocial concerns.⁵

Up to 94% of AYA survivors diagnosed during adolescence or young adulthood report at least one cancer-related worry.^{6,7} AYA survivors report a range of cancer-related concerns, particularly about recurrence and future health.^{6–11} Although these concerns are relevant to all survivors, they may be more pronounced for AYAs who are establishing psychological and financial independence.

Little is known about the process of developing cancer-related worry. A better understanding of this construct is crucial, as cancer-related worry appears to be associated with several important psychosocial outcomes. There is evidence that high levels of cancer-related worry are associated with health behaviors, including low rates of breast self-

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examination, high rates of substance use, and higher rates of physical activity in AYA survivors.^{12–14} Additionally, cancer-related worry is associated with depression and anxiety in cancer survivors.^{15–17} The prevalence of cancer-related worry among AYA survivors, along with its documented relationship with maladaptive health behaviors and adverse psychosocial outcomes, indicate a need to better understand cancer-related worry and explore factors that may buffer the risk for high levels of cancer-related worry in this population.

Parent and peer relationships

Support from parents and peers plays an important role in decreasing stress and increasing adaptive coping in AYA cancer survivors.^{18,19} Thus, supportive relationships with parents and peers may serve to protect AYA cancer survivors from distress, including cancer-related worry. AYA cancer survivors who feel supported by their family and friends may experience less cancer-related worry than peers who feel less supported because they have more confidence that they will continue to have support should cancer-related problems arise.

Self-esteem as a mechanism

There may also be indirect effects that account for part of the associations between support and cancer-related worry. Self-esteem, or one's evaluation of his/her self-worth,²⁰ is comprised of individuals' perceptions of their strengths and weaknesses in valued domains (e.g., academics, self-reliance, appearance). Self-esteem is theorized to develop, in part, as a result of supportive relationships with parents and peers.²⁰ Low self-esteem is associated with adverse psychosocial outcomes among individuals with cancer.^{21–23} Thus, self-esteem may partially account for the relationship between parent and peer support and distress, including cancer-related worry. AYAs who have supportive relationships likely have higher self-esteem because their supportive relationships foster a greater sense of self-worth. In turn, AYAs with high self-esteem may have more confidence in their ability to effectively manage cancer-related problems that may arise, thus buffering the risk for high cancer-related worry.

Gender

Gender is likely to be associated with cancer-related worry, peer support, and self-esteem, as gender differences have emerged in these and similar constructs in the adolescent and young adult literature. Females with cancer report more anxiety/worry than males with cancer.^{7,21,23} In the general population, females have reported more peer support than males,^{24–26} and males have reported higher self-esteem than females.^{25,27,28} Males and females in the general population have reported similar levels of support from parents.^{25,26}

Aims and hypotheses

The primary aim of this study was to investigate the potential role of self-esteem as a mechanism for associations between parent and peer relationships with cancer-related worry in AYA cancer survivors. It was expected based on

theoretical and empirical literature that parent and peer support would each be inversely associated with cancer-related worry and that self-esteem would partially account for this effect, such that higher support from parents and peers would be associated with higher self-esteem, which, in turn, would be associated with lower cancer-related worry. A secondary aim of this study was to assess for gender differences, given prior research findings.

Methods

Procedure

This project was part of a larger study at an urban cancer center investigating identity development and psychosocial outcomes in AYA cancer survivors. Eligibility criteria included: (1) current age 15–25; (2) initial cancer diagnosis between ages 14 and 21; (3) ≥ 6 months posttreatment; (4) able to provide consent (if ≥ 18 years of age), or assent in combination with parental consent (if < 18 years of age); (5) English speaking. Survivors with severe cognitive impairment, as identified by their physician, were excluded if the impairment was severe enough to preclude them from being able to provide informed consent/assent or complete the study assessments.

Eligible survivors received a letter from the study investigators outlining the purpose of the study and inviting participation. The letter was accompanied by an informed consent document, questionnaire, and a postage-paid envelope to return completed documents. A research assistant contacted survivors (or their parents, in the case of minors) by phone if they had not responded to the letter within 2 weeks and obtained informed consent (and assent, when needed) from interested survivors. Assessments took place mostly by phone or through paper survey sent either by mail or sent through secure email. Multiple calls, mailings, and emails were made to maximize response rate.

Measures

Demographic variables. Sociodemographic information, cancer diagnosis, and treatment information were collected by participant self-report, and verified by medical record review.

Worry. Worry was assessed using six items about cancer-related worries pertinent to AYAs. These items were developed by the research team using data collected from an earlier qualitative phase of the study, a review of the existing literature, and clinical expertise (J.S.F.). Items fell into five domains: recurrence, future health, fertility, sense of vulnerability, and distress when reminded of cancer. Item scores were summed to create a total cancer-related worry score (possible range 5–26). The scale had acceptable reliability ($\alpha = 0.70$).⁶

Self-esteem. Self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSES)²⁹ and the Global Self Worth (GSW) scale of the Self-Perception Profile for Adolescents (SPPA).³⁰ Both scales assess global self-worth; the RSES contains 10 items, and the GSW contains 5 items. Both scales have strong psychometric properties,^{29–31} and both scales had acceptable reliability in this sample (RSES $\alpha = 0.91$; SPPA $\alpha = 0.79$). Both scales were utilized because

they measure slightly different aspects of global self-worth; the GSW measures whether participants like themselves, whereas the RSES measures both whether participants like themselves and whether participants think they embody valuable characteristics. This slight difference between the measures is reflected in their moderate correlation with each other ($r=0.34, p<0.0001$).

Parent and peer support. Parent support was assessed with the attachment to parents scale from the Inventory of Parent and Peer Attachment (IPPA).³² This well-validated scale consists of 28 items measuring the quality of communication, degree of trust, and conflict with parents. Peer support was assessed using the attachment to peers scale of the IPPA, which contains 25 items measuring the quality of communication, degree of trust, and alienation in peer relationships. For both scales, items are scored on a five-point Likert scale, with higher scores indicating greater attachment. The measure had excellent reliability in this sample ($\alpha \geq 0.93$ on each scale).

Analysis plan

The relationships among parent support, peer support, self-esteem, and cancer-related worry were assessed using structural equation modeling (SEM)³³ in MPlus. The observed self-esteem variables were both utilized to create a latent self-esteem variable. Potential medical and demographic covariates were identified from the literature, and variables demonstrating significant bivariate correlations with any of the main study variables were added to the model. Age at assessment, age at diagnosis, and time since diagnosis were considered for inclusion; age at diagnosis and time since diagnosis were significantly associated with cancer-related worry ($r=0.20, p=0.02$ for both variables; see Table 1 for additional details) and were included in the model. Paths with $p \geq 0.10$ were then removed in a step-wise fashion until only paths with $p < 0.10$ remained. The final model was assessed using the following criteria: an insignificant chi-square (χ^2) statistic indicating no significant difference between the model and the data; a comparative fit index of over 0.90; a root mean square error of approximation under 0.10 (including the upper bound of the 90% confidence interval); and a standardized root mean square residual of under 0.10.³⁴⁻³⁶ Gender comparisons for main study variables were assessed using two-tailed, independent samples *t*-tests in IBM SPSS Statistics 24 (SPSS). All skew and kurtosis statistics for the main model were within an acceptable range (± 2).

TABLE 1. BIVARIATE CORRELATIONS BETWEEN MAIN MEASURES AND MEDICAL/DEMOGRAPHIC COVARIATES

Measure	Age at T1	Age at diagnosis	Time since diagnosis
Peer support	-0.05	0.03	-0.09
Parent support	0.10	0.08	0.05
Self-esteem (RSES)	-0.08	-0.06	-0.07
Self-esteem (GSW)	-0.06	-0.06	-0.04
Cancer-related worry	-0.01	0.20*	-0.20*

* $p \leq 0.05$.

RSES, Rosenberg Self-Esteem Scale; GSW, Self-Perception Profile for Adolescents Global Self-Worth.

Results

Participants

Overall, 382 AYAs were determined to be eligible and the study team was able to contact 221 of these survivors. Common reasons for refusal to participate included not interested ($n=22$); not comfortable ($n=16$); and too busy ($n=15$). The final sample consisted of 153 survivors. One survivor did not complete any of the measures utilized in this substudy and was removed from analyses, leaving a final sample size of 152. Survivors' ages ranged from 16.2 to 25.9 years ($M=21.8$, standard deviation=2.6). at study enrollment. Over half (58.6%) were male, and 86.8% were White. See Table 2 for detailed demographic and medical characteristics. There were no demographic or medical differences between responders and nonresponders.

Relationships among parent support, peer support, self-esteem, and cancer-related worry

Self-esteem (GSW) and parent and peer support were similar to normative samples.^{32,37} Please see Table 3 for descriptive statistics of study measures and Table 4 for bivariate correlations among the main study variables. The initial SEM model assessing the potential role of self-esteem as a mechanism in the associations between perceived parent and peer support and cancer-related worry was just-identified. Therefore, the paths representing the relationships between the latent self-esteem variable and its two self-esteem variables (RSES and GSW) were fixed to one to ensure that the observed variables contributed equally to the latent variable and the model could be identified. Figure 1 shows the standardized SEM results for the resulting model.

In contrast to hypotheses, higher perceived support from parents and peers was significantly related to lower self-esteem. In accordance with predictions, higher reported self-esteem was associated with lower cancer-related worry. Self-esteem emerged as an explanatory variable in the relationship between the support variables and cancer-related worry, such that the significant associations between support variables and cancer-related worry in the bivariate correlation analyses (parent support: $r=0.23, p=0.006$; peer support: $r=0.21, p=0.010$) dropped to almost zero in the multivariate model, indicating a full, rather than a partial, mediation. Time since diagnosis emerged as a significant covariate, such that survivors with greater time since their cancer diagnosis reported less cancer-related worry. Model fit was acceptable by multiple indices.

Gender comparisons

Results of the two-tailed, independent samples *t*-tests comparing males to females on main outcome variables are presented in Table 5. As hypothesized, female survivors reported significantly more cancer-related worry than male survivors, and there were no statistically significant differences between male and female survivors' perceptions of parent support. Contrary to expectations, there were no significant differences between males and females on either measure of self-esteem, nor were there statistically significant differences between males' and females' perceptions of peer support.

TABLE 2. DEMOGRAPHIC AND MEDICAL CHARACTERISTICS

Variable	n	%	M	SD	Range
Age (years)	152		21.8	2.6	16.2–25.9
Age at diagnosis (years)	145		16.8	1.9	14–20
Time since diagnosis (months)	145		54.7	24.7	10–120
Time since ending treatment (months)	111		44.1	24.2	4–100
Gender					
Male	89	58.6			
Female	63	41.4			
Ethnicity					
White	132	86.8			
Hispanic	11	7.2			
Black/African American	4	2.6			
American Indian/Alaska Native	1	0.7			
Asian/Pacific Islander	1	0.7			
Multiethnic	3	2.0			
Currently a student	106	69.7			
Highest education level completed ^a					
Completed high school	3	6.5			
Partial college	10	21.7			
Completed 4-year college	28	60.9			
Completed graduate school	2	4.3			
Other training	3	6.5			
Currently employed ^b					
Part-time	49	52.7			
Full-time	44	47.3			
Cancer diagnosis					
Lymphomas	52	34.2			
Sarcomas	38	25.0			
Germ cell tumors	28	18.4			
Leukemias	10	6.6			
Thyroid cancers	9	5.9			
Gynecological cancers	3	2.0			
Brain/central nervous system	3	2.0			
Other ^c	9	5.9			
Age at diagnosis (years)	145		16.8	1.9	14–20
Time since diagnosis (months)	145		54.7	24.7	10–120
Time since ending treatment (months)	111		44.1	24.2	4–100
Type of treatment ^d					
Chemotherapy	118	77.6			
Radiation	65	42.8			
Surgery	121	79.6			
Multimodal treatment	113	74.3			

^aIncludes only participants not currently in school.

^bIncludes only participants who reported being employed at least part-time.

^cIncludes: breast cancers, neuroblastomas, gastrointestinal cancers, head and neck cancers, and liver cancers.

^dPatients could endorse more than one type of treatment. SD, standard deviation.

TABLE 3. DESCRIPTIVE STATISTICS

	M	SD
Cancer-related worry	14.59	4.38
Self-esteem RSES	23.17	5.19
Self-esteem GSW	3.12	0.43
Parent support	55.79	16.39
Peer support	49.20	14.17

Discussion

Cancer-related worry is common among AYA cancer survivors^{6–11} and has been linked to health behaviors^{12–14} and psychosocial outcomes.^{15–17} Little is known about factors that may increase risk or buffer from cancer-related worry. This study adds to the growing literature on cancer-related worry by examining its associations with potential modifiable covariates (i.e., perceived parent and peer support, self-esteem) that could be targeted in interventions.

Relationships among cancer-related worry, self-esteem, and perceived parent and peer support

As anticipated, higher self-esteem was associated with lower cancer-related worry in SEM analyses. However, in contrast to expectations, higher perceived support from parents and peers were associated with lower self-esteem. Support variables did not have direct associations with cancer-related worry. Thus, it appears that bivariate associations between support and cancer-related worry result from the influence of parent and peer support on self-esteem.

Given prior literature indicating that perceived parent and peer support has been associated with higher self-esteem and lower levels of anxiety, worry, and other distress in pediatric cancer,^{38–40} and that AYAs perceive support from others an important tool to scaffold their coping,^{19,41} the results of the current analyses were surprising. However, it should be noted that prior quantitative analyses^{38,40} did not include young adults, and one study's findings were based on the number of sources of support, rather than a measure of quality of supportive relationships.³⁸ Thus, it is important to consider how the associations between perceived support, self-esteem, and cancer-related worry may be different for older AYAs than for younger adolescents and children.

TABLE 4. BIVARIATE CORRELATIONS AMONG MAIN MEASURES

Measure	1	2	3	4	5
1. Peer support	—				
2. Parent support	0.46***	—			
3. Self-esteem (RSES)	−0.47***	−0.58***	—		
4. Self-esteem (GSW)	−0.14	−0.29***	0.25**	—	
5. Cancer-related worry	0.21**	0.23**	−0.29***	−0.11	—

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

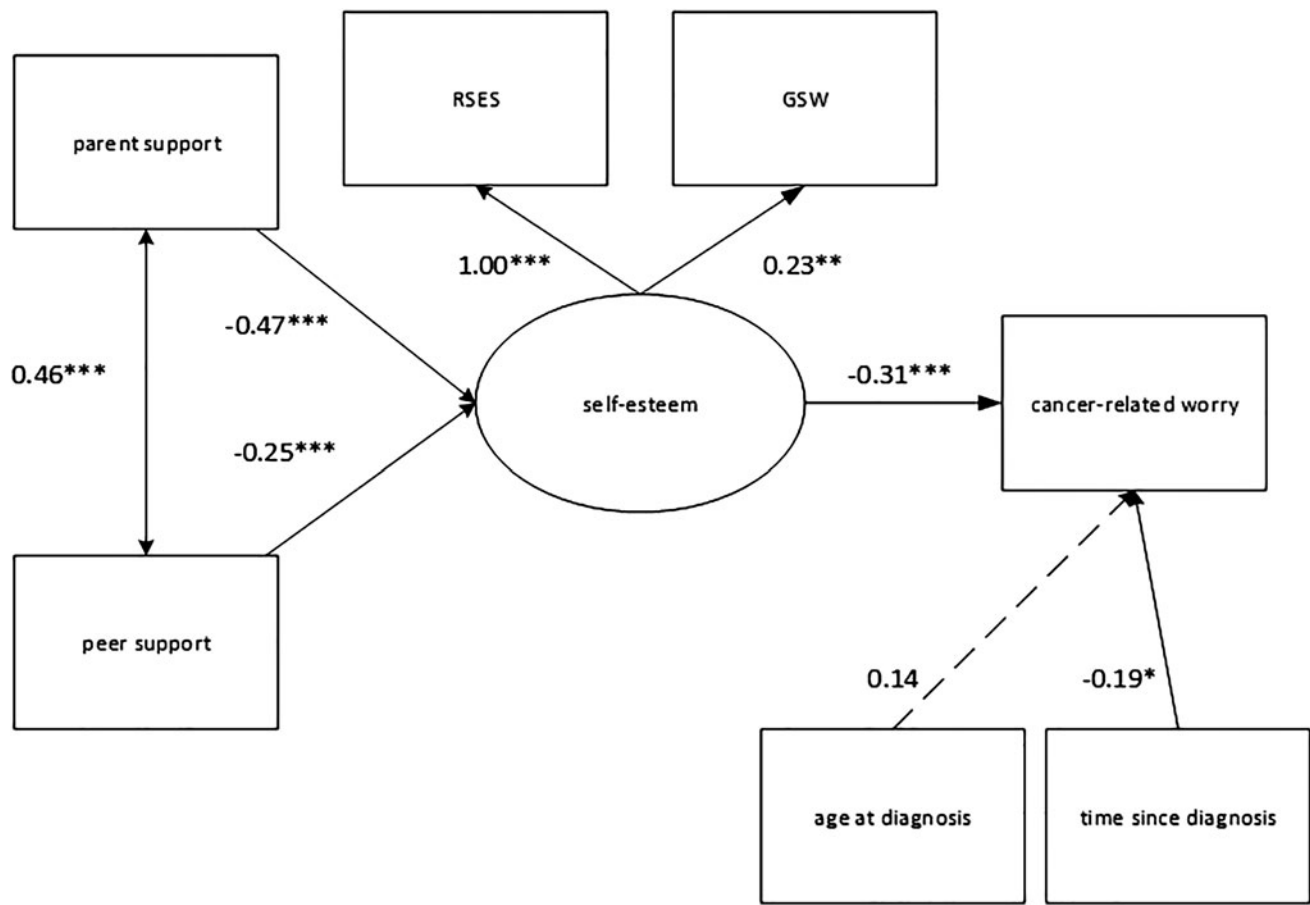


FIG. 1. Main model with relevant medical/demographic covariates: $\chi^2(13)=13.26, p=0.43$; comparative fit index = 0.997; root mean square error of approximation = 0.01 (90% confidence interval = 0.00–0.08); standardized root mean square residual = 0.04. — — —, statistically insignificant associations. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$. RSES, Rosenberg Self-Esteem Scale; GSW, Self-Perception Profile for Adolescents—Global Self-Worth.

These surprising results may be explained by the theory of reciprocal effects similar to the accumulating effects and transactional influences proposed by Hankin et al. to conceptualize internalizing symptoms.⁴² In such a model, parents and peers might provide additional support for AYA survivors because they perceive them as vulnerable. This perception of vulnerability could stem from survivors' medical history⁴³ or from preexisting psychosocial factors, such as low self-esteem or high anxiety and worry, that would likely pull for additional support from those around them.^{44–46} The additional support would then interact with cancer-related worry and self-esteem in AYA survivors by inadvertently signaling that survivors cannot manage cancer-

related challenges independently, creating a reciprocal pattern in which AYAs' self-esteem lowers and cancer-related worry increases, thus drawing more support from parents and peers in a cyclical fashion.

Gender comparisons

Female survivors reported significantly more cancer-related worry than males, which is consistent with existing literature about gender differences in cancer-related worry among young adult survivors.^{7,21,23} Similarly, our finding that male and female survivors reported similar levels of attachment to parents is consistent with the extant literature.^{25,26}

TABLE 5. T-TEST COMPARISONS OF MAIN VARIABLES BY GENDER

	Male		Female		t-Test		
	M	SD	M	SD	T	df	p-Value
Cancer-related worry	13.94	4.22	15.51	4.49	-2.15	144	0.03
Self-esteem RSES	23.75	5.26	22.39	5.04	1.55	142	0.12
Self-esteem GSW	3.10	0.40	3.13	0.46	-0.43	144	0.67
Parent support	55.34	15.18	56.44	18.10	-0.39	116	0.70
Peer support	49.25	13.40	49.13	15.29	0.05	149	0.96

The lack of significant gender differences on measures of self-esteem is inconsistent with prior literature about self-esteem in healthy AYAs.^{25,27,28} Perhaps the role of gender in self-esteem development may be different for AYA cancer survivors than for healthy peers. There may be aspects of the cancer experience that could eliminate some of the advantages of being male in a male-dominated society, thus leading to the development of self-esteem that is not significantly different compared with female peers.

Also in contradiction to expectations, male and female survivors reported similar levels of peer support. Existing literature indicates that, at least in healthy AYA populations, females report higher levels of peer support than males.^{25,26} Qualitative analyses of AYA cancer survivors' perceptions of support throughout their cancer trajectories indicate that females are more likely to report feeling abandoned by their friends during treatment than males.¹⁹ Perhaps the close female friendships reported by healthy AYAs are more challenged by the cancer experience than male survivors' friendships, thus balancing out male and female survivors' perceptions of support from peers.

Study limitations

Due to sample size limitations, some potentially relevant covariates, such as diagnosis and treatment, could not be examined. Similarly, some variables could not be controlled given the sample's homogeneity; the sample was largely White, highly educated, and employed. Additionally, the cancer-related worry scale was not subjected to the rigorous psychometric evaluation necessary for formal scale development. However, it demonstrated adequate reliability, and its similarity to a recent psychometrically validated scale offers preliminary support for the face validity of the measure.⁷ Finally, this was a cross-sectional study, which limits ability to make causal attributions. Future research should consider the inclusion of data about gender identity and sexual orientation, as these variables may affect stress and adjustment to cancer.

Clinical implications and future directions

The relationships among perceived support, cancer-related worry, and self-esteem in AYA cancer survivors are likely complex and reciprocal. It is possible that extra support from parents and peers (whether offered because the survivor presents with low self-esteem and high cancer-related worry or simply because the AYA is viewed as vulnerable as a result of having had cancer) contributes to lower self-esteem and higher cancer-related worry as a result of a lower sense of self-efficacy and lower perceived resilience (i.e., the capacity to adapt to challenges),⁴⁷ which then cyclically pulls for further support from parents and peers. Given the lack of understanding about these relationships, it is important to examine parents' and peers' perceptions of survivors' vulnerability and associated supportive behaviors in the context of self-esteem and cancer-related worry. Future research should explore survivors' self-perceptions regarding self-efficacy and resilience as related to self-esteem, parent and peer relationships, and cancer-related worry. It is also important to continue to examine these variables as they relate to health behavior.

AYAs with cancer and AYA cancer survivors would likely benefit from interventions to maintain and/or bolster self-esteem. Peer support programs in which AYAs with cancer and AYA cancer survivors can interact with peers who also have cancer may provide support that is unique from that provided by healthy peers. Interaction with peers with cancer could potentially support the development of self-esteem by fostering relationships with peers who have a shared cancer experience, sharing tips for connecting with healthy peers, etc.⁴⁸⁻⁵¹ It is notable that AYAs with low self-esteem and low self-efficacy have been found to gain more from such peer support programs than peers with higher self-esteem and self-efficacy.⁵²

AYAs with cancer and AYA cancer survivors may also benefit from targeted interventions to teach problem solving and develop skills relevant to managing cancer-related concerns.⁵³ A recent multicenter randomized controlled trial is assessing the efficacy and feasibility of an online cognitive behavioral group intervention for AYA cancer survivors.⁵⁴ While the outcome data for this program has yet to be published, such interventions have the potential to help AYAs develop confidence that they can manage cancer-related issues and cope with cancer-related worries. Decreasing cancer-related worry, whether by targeting it directly or through possible mediating variables, such as self-esteem, could lower the risk of anxiety, depression, and risky health behaviors.^{12,13,15-17}

Moving forward, it is important to clarify the roles of parent support, peer support, self-esteem, and other related factors in the development of cancer-related worry and relevant health behaviors. Such clarification will help to identify survivors who are at risk of developing high levels of cancer-related worry and better understand and build upon the mechanisms underlying effective interventions. Finally, it is crucial to focus efforts on dissemination of interventions that prove effective in fostering self-esteem and mitigating the development of high cancer-related worry.

Institutional Review Board Statement

This study was approved by the Institutional Review Board at Memorial Sloan Kettering Cancer Center.

Disclaimers

These data were collected at Memorial Sloan Kettering Cancer Center where Dr. G.A.M. and Dr. J.S.F. were previously affiliated. These data were digitally presented as a poster at the 2020 Society of Pediatric Psychology Annual Conference (SPPAC).

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Author Disclosure Statement

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