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Health-related hindrance of personal goals of adolescents with cancer: The role of the interaction of race/ethnicity and income

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Abstract

Background—This study examined the interaction of race/ethnicity and income to health-related hindrance (HRH) of personal goals of adolescents with cancer.

Procedure—Adolescents ($N=94$) receiving treatment for cancer completed a measure of HRH, (including identification of personal goals, rating the impact of health on goal pursuit, and ratings of goal appraisals). The interaction of race/ethnicity and income on HRH was examined. Goal content and appraisal were compared by race/ethnic groups.

Results—The interaction between race/ethnicity and income was significant in predicting HRH, with HRH increasing for minority adolescents as income increases and HRH decreasing for white adolescents as income increases. Higher income minority adolescents reported the most goals. Low income minorities reported the least difficult goals. Goal content did not differ between groups.

Conclusions—Sociodemographic factors contribute to HRH in adolescents with cancer. Structural and psychosocial support during treatment to maintain goal pursuit may improve psychosocial outcomes.

Keywords

adolescent; pediatric oncology; socio-economic status; minority; health-related quality of life

Adolescents with cancer are a medically and psychologically vulnerable group with more intense treatments and higher morbidity and treatment-related toxicities relative to younger patients, yet supports they receive are often not developmentally appropriate or matched to their unique developmental needs (Keegan et al., 2012; National Cancer Institute & LIVESTRONG Young Adult Alliance, August 2006). For adolescents, pursuing and achieving goals is a hallmark of this developmental stage as it is central to identity formation and transition to adulthood, and contributes to an overall sense of well-being (Nurmi, 1993;

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Informed Consent: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

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Schulenberg, Bryant, & O'Malley, 2004). Personally meaningful goals can vary widely across adolescents but common examples of goals for this age group may be to graduate from high school, get a job, or spend more time with friends. Unfortunately, cancer-related burdens coupled with poor psychosocial support pose challenges to goal attainment for this vulnerable population, which may contribute to long-term deleterious outcomes. Indeed, several findings of the Childhood Cancer Survivor Study indicate difficulty achieving typical developmental tasks of adolescence and young (AYA) adulthood such as educational goals, marriage, and employment (Zeltzer et al., 2009). Furthermore, survivors diagnosed in adolescence are at increased risk for greater psychosocial distress including post-traumatic stress and lower quality of life in survivorship relative to children diagnosed with cancer at younger ages (Kazak et al., 2010).

The impact of disease management and symptoms associated with having a chronic health condition (i.e., pain, fatigue, and other physical symptoms) on pursuit of personally meaningful goals is referred to as health-related hindrance (HRH; Schwartz, 2010; Schwartz & Drotar, 2009). Prior findings indicate that HRH is higher for adolescents with cancer and young adult survivors with treatment-related late effects compared to healthy peers; and that it is related to poorer health-related quality of life, perceptions of well-being, positive and negative affect, depression, and psychological distress (Schwartz, 2010; Schwartz & Drotar, 2009). Given the close relationship between HRH and other psychosocial variables, HRH is a potential marker of poor adjustment to cancer, and poor adjustment during treatment can affect long-term psychosocial outcomes in survivors (Kazak et al., 1997; Stuber et al., 1997; Stuber et al., 2010). HRH can potentially serve as an important intervention target to improve psychosocial outcomes for those most at risk by identifying and reducing the barriers to achieving these important developmental goals for adolescents on treatment and beyond. HRH is also unique in that it focuses on how illness impacts goals self-identified by the individual, thus highlighting the impact of illness on what is personally meaningful to the patient.

Socioeconomic status (SES) and race/ethnicity have also been related to health outcomes for adolescents in several domains including higher mortality rates, reduced access to healthcare, poorer chronic health condition outcomes, and higher mental health concerns (Flores & The Committee on Pediatric Research, 2010; Williams & Collins, 1995). Research examining the role of SES and race/ethnicity has generally supported a synergistic or “double jeopardy” hypothesis with regards to health outcomes (Ferraro & Farmer, 1996). However, a small but consistent segment of individuals living in low SES environments do not evidence poor health outcomes (Chen, Lee, Cavey, & Ho, 2012; Chen, Miller, Lachman, Gruenewald, & Seeman, 2012; Koinis-Mitchell et al., 2012). Chen and Miller have explained these findings through the “Shift and Persist” model (2012) suggesting that positive health outcomes in children with fewer financial resources may be due to the development of adaptive coping styles for stress (accepting stressors and reappraising uncontrollable situations in positive ways) and increased persistence towards valued goals. For individuals with this adaptive style, value is placed on controlling and adjusting perceptions in response to stressors. Through adaptive reappraisal in response to stressors, children can reduce the impact of psychosocial stressors on health outcomes.

The interaction between race/ethnicity and SES has predicted childhood asthma morbidity (Chen, Martin, & Matthews, 2006) and inadequate engagement in preventative healthcare behaviors such as cancer screenings (Burgess et al., 2011; Gornick et al., 1996) and influenza immunization (Gornick, et al., 1996). With regards to academic achievement, adolescents of minority status describe similar goal content (Massey, Garnefski, & Gebhardt, 2009), but more goal frustration and are more likely to indicate that reaching goals is the result of hard work rather than inherent ability when compared to white adolescents (Phinney, Baumann, & Blanton, 2001). Furthermore, SES more strongly predicts academic achievement in white students, possibly due to the likelihood that white students live in neighborhoods with more resources (Sirin, 2005). The inclusion of both race/ethnicity and SES in models used to understand health and psychosocial adjustment accounts for the additive or multiplicative effect of having several vulnerabilities to poor health outcomes (Williams, Lavizzo-Mourey, & Warren, 1994). However, research examining the interaction of race/ethnicity and income on child and adolescent outcomes is sparse (Yoshikawa, Aber, & Beardslee, 2012). With rising rates of children from multiracial backgrounds, considering race as majority/minority is a first step in elucidating the stressors experienced by children of minority status (Burney & Beilke, 2008).

Sociodemographic characteristics are also relevant to cancer-related disparities. Despite significant improvements in pediatric cancer survival rates over the past two decades, gains in AYA survival rates have lagged behind rates for younger patients (National Cancer Institute & LIVESTRONG Young Adult Alliance, August 2006). Minority adolescents are especially vulnerable as they demonstrate poorer adherence (Landier et al., 2011) and ultimately lower survival rates than white adolescents (Bhatia, 2011; Linabery & Ross, 2008). Additionally, factors affected by SES such as insurance status, access to quality health care, engagement in risky health behaviors, and knowledge about disease risk, late effects, and surveillance, all likely contribute to worse cancer outcomes (Bhatia, 2011). As part of an initiative to reduce age-related disparities in cancer, the AYA Oncology Progress Review Group called for more research explicating the developmental characteristics of AYA that impact adherence, care seeking, and health/psychosocial outcomes (National Cancer Institute & LIVESTRONG Young Adult Alliance, August 2006). Thus, HRH is an optimal target of study in this population as it highlights the impact of health on personally important goals of adolescents, is a construct known to impact health-related quality of life and adjustment, has the potential to impact treatment adherence given possible conflict of health-related and personal goals, and can signal the need for additional support to pursue goals from the health care team and psychosocial services.

The purpose of the current study was to examine the contribution of sociodemographic factors, specifically the interaction of race/ethnicity (minority status versus white) and household income (lower versus higher family income), to HRH to aid in identifying adolescents at greatest risk for poor psychosocial outcomes. The impact of socio-demographic factors on HRH has not been thoroughly explored to date. It was hypothesized that adolescents with cancer of racial/ethnic minority status living in lower income families would experience the highest amount of HRH and white adolescents with cancer living in higher income families would experience the lowest HRH. To better understand factors that relate to goal pursuit among adolescents that differ by race/ethnicity and income, differences

were examined in other goal-related variables (goal content, goal appraisals, and number of goals) across four groups: lower income minority status, higher income minority status, lower income white, and higher income white.

Method

Participants

Patients were eligible for study participation if they were currently receiving active treatment for cancer for at least one month, were between the ages of 13 and 19, spoke English, and had a primary English-speaking caregiver also able to participate. Patients with cognitive limitations that could affect their ability to complete measures independently were excluded by the medical team. Of 133 eligible patients, 123 agreed to participate, and 102 completed the study. Of those, 94 reported household income—a required variable for the current analyses. Reasons for not participating included parent refusal ($n = 4$), felt study was too much work ($n = 2$), adolescent had cognitive limitations ($n = 1$), patient did not feel well ($n = 1$), and no reason given ($n = 2$).

Sample demographics are presented in Table 1. Age and gender did not differ between SES/ethnic groups. Caregivers were primarily female (83.0%) and the child's biological parent (94.7%). Cancer diagnoses were leukemia/lymphoma (50.0%), solid tumors (39.4%), and central nervous system tumors (10.6%). Diagnoses were evenly distributed between income/ethnic groups. The majority of patients received chemotherapy (96.8%). Other treatments included radiation (40.4%), surgery (27.7%), and/or bone marrow transplant (9.6%). Approximately half of the sample (53.2%) received more than one treatment. A little more than a quarter of the sample had experienced a relapse (26.6%) and relapse was evenly distributed between income/ethnic groups. Patients were on average 1.65 years ($SD = 2.98$) since initial diagnosis.

Procedures

After IRB approval, patients and a caregiver were approached by the principal investigator or study coordinator during an outpatient clinic visit or on the inpatient floor of a large East Coast children's hospital as part of a larger IRB-approved study examining goals and well-being among adolescents. Data were collected from March 2007 to April 2009. All caregivers and adolescents age 18 or 19 provided written informed consent and adolescents age 13 to 17 provided written assent prior to participation. Patients and caregivers completed study measures at the hospital or home. Adolescent participants were compensated for participation.

Measures

Demographics—Parents reported adolescent gender, age, and race/ethnicity. Race/ethnicity was dichotomized into white or racial/ethnic minority (i.e., African-American, Asian, Hispanic, more than one race, or other). Parents also reported total annual household income and number of people in the home.

Disease Variables—The Intensity of Treatment Rating Form (ITR-2) is a validated measure for rating oncology treatment intensity on a 1 to 4 scale, higher scores indicate greater intensity (Werba et al., 2007). Two pediatric oncology providers independently reviewed patients' electronic medical records and completed the ITR-2. Medical records were also used to identify the patient's diagnosis and time since diagnosis. Cancer diagnoses were categorized by leukemia/lymphoma, solid tumors, or central nervous system tumors to explore the distribution of diagnoses across study variables of interest (income and race/ethnic groups).

Household Income—Annual household income and number of people in the home were used in accordance with the 2009 government poverty-classification guidelines to estimate socioeconomic status (U.S. Department of Health and Human Services, 2009) corresponding to the time frame of study data collection (2007-2009). Percent of the poverty threshold was calculated by dividing parent-reported income by the poverty threshold that corresponded to the number of people living in the home. For example, the poverty threshold for a family of six is \$28,400. Their actual income of \$44,500 would be considered 157% of the poverty threshold. Percent of the poverty threshold was used as a continuous variable for moderation analyses. For post-hoc analyses, poverty-classification was dichotomized into lower income (0-199% of the poverty threshold for household size) and higher income (200%+ the poverty threshold) based on the classification outlined by the US Department of Health and Human Services to determine eligibility for federal programs (U.S. Department of Health and Human Services, 2009). In most states, families at or below 200% of the federal poverty threshold are eligible for Children's Health Insurance Programs (Hoag et al., 2011), thus this cut-point was utilized for the current study to differentiate lower and higher SES.

Goal-related variables—The Health-Related Hindrance Inventory (HRHI; Schwartz, Kazak, Radcliffe, Barakat, & Straton, 2006) was developed based on a goal-assessment methodology, the Personal Projects Analysis (PPA; Little, 1983), and was adapted specifically for adolescents with cancer. The HRHI asks adolescents to list their goals and chose up to 10 important goals on which to rate the impact of the subcategories pain, fatigue, other physical symptoms, and behaviors to take care of their health on ability to pursue and achieve each self-identified goal using a 7-point scale (0 = no effect; 6 = extreme effect). For example: "How much does pain interfere with your ability to work on and achieve this goal?" Ratings of HRH were averaged across goals for each subcategory and also across all ratings to yield a total HRH score. Higher scores indicate greater HRH. Appraisals of importance, difficulty, support needed to achieve goals, support received to achieve goals, and the likelihood of achieving goals (efficacy) are rated on 7-point scale (0 = no/not at all to 6 = extreme/extremely) and are also averaged across goals. To categorize goal content, two raters coded goals using a modified version of the PPA goal-coding scheme (Chambers, 2003; Little & Chambers, 2004; Schwartz & Drotar, 2009). Content areas were academic, job/career, health, body/appearance, interpersonal, intrapersonal/value, leisure, religion, and administrative/maintenance. Details of the development of the coding scheme and coding procedures, as well as examples of goal content reported by the current sample are provided elsewhere (Schwartz & Parisi, 2013).

Data Analysis

Descriptive statistics were calculated for sample characteristics (Table 1) and goal-related variables. To understand the association of sociodemographic factors to HRH, a hierarchical regression was conducted using dichotomous minority status (minority/white) and mean-centered household income entered in step one and the interaction between the two entered in step two to predict HRH (total score and subcategories) according to Baron and Kenny's methodology (Baron & Kenny, 1986). Power to detect a medium effect size with a p -value of 0.05 was 0.88 for the regression model with three predictors (Faul, Erdfelder, Lang, & Bucher, 2007). To further understand the interactions, post-hoc probing was conducted according to the methods of Holmbeck (2002). T-tests of simple slopes were examined for differences in HRH of adolescents of minority status and white adolescents by income level.

To further explore group differences and facilitate interpretation of differences in HRH, exploratory analyses compared adolescent-reported goal appraisals (support have, support need, efficacy, importance, and difficulty) and number of self-identified goals across income/minority groups (lower income minority, higher income minority, lower income white, and higher income white adolescents) using ANOVAs or Kruskal-Wallis tests in the case of non-normal distributions and Fischer's Least Significant Difference post-hoc test for significant comparisons. Observed power for ANOVAs was 0.49 (Faul, et al.). To determine whether or not groups differed by perceptions of adequate support received, discrepancies in ratings of support needed and support received were examined within each group using paired sample t -tests. Exploratory analysis of differences in goal content by group was also examined with chi-square tests using dichotomous variables for each content category, indicating presence/absence of goals for each area (e.g., whether or not participant reported having an academic goal).

Results

Preliminary Analyses

The relationships between Total HRH and adolescent age ($r = 0.10$, $p = .348$), time since diagnosis ($r = -0.10$, $p = .926$), and ITR-2 rating ($r = 0.01$, $p = .949$) were examined as potential covariates using Pearson correlations; these relationships were all not significant. Additionally, relapse status and type of cancer (leukemia/lymphoma, solid tumors, central nervous system tumors) were also examined as potential covariates using a one-way ANOVA and HRH did not differ significantly in any of these analyses: for Relapse Status, $F(1, 91) = 0.00$, $p = .984$; for Cancer Type: $F(2, 91) = 0.58$, $p = .563$. Total HRH did not differ between ethnicities, $F(4, 89) = 0.42$, $p = .79$. Therefore, there were no covariates included in subsequent analyses.

Regression Analyses: Testing the Association of Race/Ethnicity X Income Level Interaction to HRH

There was a significant race/ethnicity by income interaction predicting total HRH, $F(3, 90) = 6.44$, $p = .001$, $\beta = -.73$, $p < .001$. Post-hoc probing indicated that the simple slope was significant for minority participants, $t(31) = 3.91$, $p < .001$, and white participants, $t(63) = -1.99$, $p = .05$. (see Figure 1) These results suggest that for minority adolescents, as income

increases HRH increases. Conversely, for white adolescents as income increases HRH decreases. The interaction term was significant for the four HRH subcategories (Pain, Fatigue, Other Symptoms, Taking Care of Health; Table 2). Post-hoc probing of the subcategory interactions indicated that simple slopes were significant for all subcategories, both for minority and for white participants, as follows: Taking Care of Health, Pain, minority $t(31) = 3.25, p = .002$, white $t(63) = -1.67, p = .099$; Fatigue: minority $t(31) = 3.99, p < .001$, white $t(63) = -1.65, p = .101$; Other Symptoms, minority: $t(31) = 3.71, p < .001$, white $t(63) = -1.80, p = .075$; Taking Care of Health: minority: $t(31) = 3.29, p = .001$, white $t(63) = -2.10, p = .039$.

Exploratory Analyses: Group Comparisons on Goal Content and Quantity

To better understand sociodemographic differences, the four groups (white/minority higher income/lower income) were compared on the goal appraisal categories of support needed, support received, perceived difficulty of goals, goal importance, and likelihood of achieving the goal (Table 3). Groups differed significantly on ratings of goal difficulty, with lower income minority adolescents rating their goals as less difficult than other groups.

Comparisons using Fischer's LSD test showed that the lower income minority group differed significantly from the white lower income group, $p = .008$, and the white higher income group, $p = .011$, but not from the minority higher income group, $p = .241$. Support needed, support received, goal importance, and likelihood of achieving the goals did not differ significantly between groups. Comparing reports of support needed with support received within groups, only white teens in the higher income group reported having significantly more support than needed, mean difference = $-0.51, t(51) = -2.88, p = .006$.

Groups were also compared on number of goals and types of goals reported. (see Table 3) Number of goals differed significantly between groups, $F(3, 90) = 3.66, p = .01$. Fischer's LSD comparisons showed that higher income minority adolescents reported having more goals than the other three groups. The higher income minority group differed significantly from the white lower income group, $p = .004$, the white higher income group, $p = .011$, and from the minority lower income group, $p = .007$. Goal content was relatively evenly distributed between groups; however, very few, if any, adolescents reported goals for some goal content categories (e.g., religion, administrative).

Discussion

An emerging literature is examining mechanisms of health disparities by race/ethnicity and SES in oncology, especially in adolescents, but more work is needed to understand the impact of sociodemographic factors on the experience and outcomes of adolescents with cancer (Bhatia, 2011; National Cancer Institute & LIVESTRONG Young Adult Alliance, August 2006). The current study elucidates the influence of race/ethnicity and household income on goal pursuit for adolescents with cancer—a vulnerable group due to high medical and psychosocial morbidity and limited appropriate psychosocial supports (Keegan, et al., 2012; National Cancer Institute & LIVESTRONG Young Adult Alliance, August 2006). As hypothesized, household income significantly moderated the association of white/minority racial/ethnic status with HRH. Contrary to hypotheses, the current results do not support the

double jeopardy hypothesis (Ferraro & Farmer, 1996), instead finding that minority lower income adolescents reported significantly less HRH than higher income minority adolescents and both groups of white adolescents, thus supporting Chen and Miller's Shift and Persist model (2012). Differences between racial/ethnic groups remain to be elucidated by future research.

Results support that minority adolescents from lower income families and white adolescents from higher income families may be especially resilient in the face of cancer. Mechanisms of resilience, however, may vary between groups. Lower HRH in lower income minority adolescents may result from utilizing more adaptive coping styles for uncontrollable stress and increased persistence towards valued goals despite adversity (Chen & Miller, 2012). An example of adaptive coping may be modifying expectations in response to stressors to mitigate the impact of cancer on psychosocial functioning. Other research has documented similar resiliency in minority children when controlling for SES with regards to lower rates of mood disorders (Merikangas et al., 2010). On the other hand, the finding that lower income minority adolescents identified the least amount of HRH, fewer goals than higher income minority adolescents, and the least difficult goals overall, indicates that their goals may be qualitatively different than those of higher income minorities and thus, less impacted by cancer. Findings in the literature on academic achievement provide some support for this possibility. Disparities in academic achievement have been found; specifically, an achievement gap exists between racial/ethnic minority children and white peers (Hemphill & Vanneman, 2011; Vanneman, Hamilton, Baldwin Anderson, & Rahman, 2009) and lower SES adolescents have previously demonstrated larger discrepancies in aspirations and expectations for educational outcomes related to more perceived financial barriers (Boxer, Goldstein, DeLorenzo, Savoy, & Mercado, 2011). Therefore, if having lower expectations for the future and lower goal achievement among lower SES minorities generalizes beyond academic goals, then it is not surprising that they would identify a low number of relatively easy goals, thus minimizing the impact of health on those goals.

It is possible that higher income minority adolescents are exposed to environments (e.g., schools, communities) that encourage the establishment of high achieving goals, yet they may have limited available informational and supportive resources (e.g., financial, emotional, and/or instrumental) to achieve goals and experience low confidence in achievability of goals in the face of cancer. Thus, the underlying mechanisms of race/ethnicity by income interactions are unknown and potentially influenced by overlapping social factors that contribute to health and well-being such as class, discrimination, and acculturation (Williams & Collins, 1995), and therefore warrant further study.

Lower income white adolescents rated their goals as the most difficult and also reported the lowest number of goals. High difficulty and low number of goals may contribute to the higher HRH reported by the lower income white group compared to the higher income white group, as the small number of difficult goals could be harder to achieve during cancer treatment. Additionally, higher income white adolescents were the only group to report receiving more support to achieve goals than they needed. The experience of high ("extra") support possibly promotes goal achievement and reduces the impact of cancer on goal pursuit, thus resulting in lower HRH. It is possible that other variables besides race/ethnicity

and income are responsible for the lower HRH and related higher perceptions of support in this group. Findings of similar goal content across groups did not inform interpretation of HRH differences, but does support previous research describing the universality of developmental tasks for this age group (Massey, et al., 2009; Nurmi, 1991), even among various ethnic groups (Phinney, et al., 2001). Thus, adolescents should be encouraged and supported to maintain goal pursuit during treatment to retain some “normalcy,” in addition to enhancing motivation for disease management in the service of pursuing meaningful goals (Schwartz & Drotar, 2006). Increasing social support and resources that support goal attainment may be important intervention targets to reduce the impact of HRH on goal pursuit for some adolescents, especially those who perceive goals as difficult to achieve and who are under-supported.

The current study was limited in that race/ethnicity was dichotomized between white and minority, thus reducing the ability to discern differences between racial/ethnic groups. Large samples take some time to accrue in pediatric oncology, making it challenging to control for all necessary variables. Future studies using larger samples of minority adolescents collected across multiple institutions including non-English speaking adolescents and larger samples of lower income white adolescents will be necessary to fully understand differences in HRH and goal processes among minority groups. This study classified race/ethnicity as majority/minority as a first step in elucidating the stressors experienced by children of minority status due to the scant research in this area. Because of the increasing numbers of children from multiracial backgrounds, previous researchers have recommended examining race/ethnicity as majority/minority to help clarify specific stressors faced by children of minority status (Burney & Beilke, 2008). Future studies with larger samples of minority patients are needed to understand differences between race/ethnicities. Similarly, we applied the federal poverty status guidelines to estimate the percentage of the federal poverty level for each patient's household. This variable was dichotomized for exploratory analyses into dichotomous lower and higher income in accords with government standards for determining eligibility for federal programs. SES is a complex construct and poverty estimations are one of many ways to measure this variable for research purposes. This dichotomous approach may have limited understanding of the specific impact of household income. It should also be noted that although a diverse sample, the number of patients in the low income group is small and may limit generalizability.

The cross-sectional nature of the study also affects the ability to understand the qualitative and longitudinal changes in goals before, during, and after treatment for cancer, limiting our understanding of how goals change throughout treatment. The study methodology was also limited by relying on clinical assessment of adolescent cognitive functioning rather than objective assessment of cognitive functioning. Finally, the generalizability of the sample to other health conditions is unknown and future work examining the impact of race/ethnicity and income on HRH in other conditions will be important to furthering our understanding of HRH in AYA.

Results from the current study have important implications for targeting those most at-risk for impaired goal pursuit during adolescence. Assessment of HRH in cancer may be most relevant to higher income, minority status adolescents and white adolescents living in lower

income environments. Specific assessment of the achievability of the goals and the supports in place to pursue them is important for identifying targets of intervention. Structural support from the adolescent's social network and psychosocial support during treatment to facilitate goal pursuit can possibly improve goal achievement and psychosocial outcomes for these vulnerable groups. It remains unclear if low HRH experienced by low income minorities is adaptive. While it presumably confers resiliency, low HRH may also indicate a lack of goal striving, which is important for providing motivation to manage disease. These adolescents may benefit from guidance to identify meaningful realistic goals to facilitate optimal transition to adulthood and to provide continued motivation to manage disease. Informational support can also impact goal motivation. For example, students who were counseled about need-based financial aid reported higher grade expectations and more time spent on homework than students that were only reminded of the high cost of education (Destin & Oyserman, 2009). Similar interventions, such as counseling patients about financial options, scholarships, and hospital resources, could be applied to adolescents with cancer to enhance their motivation to set and pursue achievable goals. Future research should explore more detailed changes in goals from diagnosis through treatment, especially for racial/ethnic minority adolescents, to better understand how cancer and sociodemographics impact adolescent goal-setting and pursuit. Developing and piloting interventions to reduce HRH among those at-risk will be important next steps to improve psychosocial outcomes and address unmet needs of adolescents with cancer.

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Abbreviations

HRH	Health-related hindrance
HRQL	Health-related quality of life
SES	Socioeconomic status
AYA	Adolescents and young adults
HRHI	Health-Related Hindrance Inventory

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Figure 1.
Interaction between Income Status and Minority Status in Predicting HRH.

Table 1

Sample demographics and Disease/Treatment Variables.

Variable	N (%)
Age [M(SD)]	15.73 (1.78)
Male	51 (54.26)
Race/Ethnicity	
Non-Latino White	70 (74.47)
Racial/Ethnic Minority	
Hispanic/Latino/Spanish	12 (12.77)
African American/Black	14 (14.89)
More than one race/ethnicity	7 (7.45)
Asian	3 (3.19)
Household Income (Percent of Poverty Line)	
Below Poverty Line 0-99%	15 (15.96)
Lower income 100-199%	14 (14.89)
Middle Income 200-399%	34 (36.17)
High Income >400%	31 (32.98)

Note. Percentages in each category may not add up to 100% due to participants who selected multiple options.

Table 2
Summary of Hierarchical Multiple Regressions Analyses Predicting HRH Subcategories and Total Score.

	Pain			Fatigue			Other Symptoms			Taking Care of Health			Total HRH		
	<i>R</i> ²	β	<i>R</i> ²	β	<i>R</i> ²	β	<i>R</i> ²	β	<i>R</i> ²	β	<i>R</i> ²	β	<i>R</i> ²	β	<i>R</i> ²
Step 1	0.01		0.01		0.01		0.01		0.01		0.01		0.01		
Minority Status		−0.10		−0.08		−0.04		−0.04		0.02		−0.06		−0.06	
Income		0.06		0.11		.08		.08		0.02		0.07		0.07	
Step 2	.13**		.16**		.15**		.14**		.17**						
Minority x Income		−0.63**		−0.71**		−0.69**		−0.67**		−0.73**					
Total <i>R</i> ²	.13**		.17**		.16**		.15**		.18**						

N = 94;

* *p* < .05;

** *p* < .01

Table 3

Goals and HRH by Ethnicity and Income Groups.

	White		Minority		
	Higher Income <i>n</i> = 52	Lower income <i>n</i> = 11	Higher Income <i>n</i> = 13	Low Income <i>n</i> = 18	Group Comparison <i>P</i>
<u>HRH <i>M</i> (<i>SD</i>)</u>					
Total	2.65 (1.45)	3.50 (1.09)	3.71 (1.46)	2.25 (1.49)	.01
Pain	2.40 (1.52)	3.13 (1.48)	3.57 (1.49)	2.21 (1.65)	.04
Fatigue	2.84 (1.53)	3.54 (1.28)	4.09 (1.58)	2.32 (1.55)	.01
Other Symptoms	2.55 (1.63)	3.51 (0.98)	3.59 (1.60)	2.11(1.58)	.02
Take Care of Health	2.82 (1.64)	3.81 (1.07)	3.60 (1.60)	2.37 (1.82)	.06
<u>Appraisals <i>M</i> (<i>SD</i>)</u>					
Support Have	4.07 (1.35)	4.43 (1.44)	3.73 (1.33)	3.82 (1.48)	.58
Support Needed	3.56 (1.06)	3.94 (0.95)	3.39 (1.17)	3.34 (1.29)	.53
Efficacy [±]	4.82 (0.83)	5.19 (0.67)	4.64 (0.88)	5.07 (0.84)	.33
Importance [±]	5.27 (0.70)	5.11 (1.11)	5.14 (0.85)	5.32 (0.78)	.87
Difficulty	3.82 (1.00)	4.18 (0.92)	3.52 (1.16)	3.06 (1.33)	.03
<u>Goal Content <i>n</i> (%)</u>					
Academic ^{±±}	43 (82.69)	11 (100.00)	11 (84.61)	16 (88.89)	.49
Job/Career ^{±±}	26 (50.00)	6 (54.54)	6 (46.15)	7 (38.89)	.83
Health ^{±±}	35 (67.31)	9 (81.81)	6 (46.15)	9 (50.00)	.17
Appearance ^{±±}	15 (28.46)	0 (0.00)	1 (7.69)	2 (11.11)	.05
Interpersonal ^{±±}	24 (46.15)	6 (54.54)	10 (76.92)	12 (66.67)	.16
Intrapersonal ^{±±}	11 (21.15)	1 (9.09)	5 (38.46)	3 (16.67)	.32
Leisure ^{±±}	36 (67.31)	7 (63.63)	9 (69.23)	12 (66.67)	.98
Religion ^{±±}	3 (5.77)	1 (9.09)	3 (23.08)	0 (0.00)	.10
Administrative ^{±±}	7 (13.46)	0 (0.00)	2 (15.38)	3 (16.67)	.58
<u>Number of Goals <i>M</i> (<i>SD</i>)</u>	8.48 (4.70)	6.55 (2.46)	12.15(5.92)	7.56 (4.06)	.015

Group differences were examined using one-way ANOVAs unless otherwise noted.

[±] Group differences were examined using Kruskal-Wallis Tests due to non-normality of distributions.

^{±±} Group differences were examined using Chi-square test of independence.