

COGNITIVELY-BASED COMPASSION TRAINING AND CANCER HEALTH EDUCATION TO
IMPROVE PSYCHOLOGICAL DISTRESS IN SOLID TUMOR CANCER SURVIVORS AND THEIR
INFORMAL CAREGIVERS: ROLE OF HOUSEHOLD INCOME AND EDUCATION

By

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Abstract

Despite dramatic improvements in survival time over the last several decades, many survivors of solid tumor cancers experience impairments in health-related quality of life (HRQOL), both during and after cancer treatments end. Relevant to this problem are socioeconomic factors, such as household income and education, that may be predict various domains of HRQOL, including psychological distress (i.e., depression and anxiety). While cancer survivorship studies usually control for these demographic characteristics, few studies directly focus on how income and education may relate to psychological distress when developing interventions intended to improve well-being for solid tumor cancer survivors (as well as their informal caregivers, i.e., family and close friends). This study therefore investigated how household income and educational background may influence how a meditation-based intervention and an active attention control group impact depression and anxiety in solid tumor cancer survivors. Cognitively-Based Compassion Training (CBCT[®]) is an eight-week meditation-based intervention that focuses on the cultivation of compassion and empathy for oneself and others. Forty-one solid tumor cancer survivor-informal caregiver dyads were randomly assigned to CBCT or a cancer health education (CHE) control. Participants completed HRQOL questionnaires, including measures of depression and anxiety, before and after the interventions. We predicted that household income and education would influence how CBCT and CHE, inclusive of caregivers, change survivor depression and anxiety. Although we did not find evidence that household income and education influence how CBCT versus CHE may change survivor depression and anxiety, the findings suggest that lower household income and less education may be associated with higher survivor depression and anxiety. Future research

with interventions to improve HRQOL and decrease psychological distress for cancer survivors and informal caregivers should continue to control for education and household income, and may also actively address these important demographic characteristics when tailoring interventions intended to improve well-being for survivors and informal caregivers.

Background

The development of effective treatments for many solid tumor cancers over the last several decades has resulted in a growing population of long-term cancer survivors. Despite these gains, many cancer survivors experience impairments in health-related quality of life (HRQOL) both during and after cancer treatments with curative intent (Silver et al., 2013). Because of this, it is crucial to understand demographic characteristics of survivors that may influence their HRQOL, and how these demographic factors may influence effectiveness of interventions intended to promote HRQOL for survivors. The goal of the present research therefore was to understand how the important demographic characteristics of household income and educational background may influence how a meditation-based intervention and an active attention health discussion control group impact psychological distress (i.e., depression and anxiety) in solid tumor cancer survivors.

According to Siegel et al. (2020), the 5-year relative survival rate is highest in prostate cancer (98%) and female breast cancer (90%), and lowest in lung cancer (19%). Despite survivorship rates drastically increasing in the past few decades, solid tumor cancer survivors remain at high-risk for a variety of psychological distress factors. Solid tumor cancer survivors (e.g., breast cancer, colorectal cancer, lung cancer) experience considerable psychological distress (depression and anxiety), often caused by physical, social, psychological, and existential stressors. For example, research has shown that adjustment disorders, along with anxiety and depressive symptomatology, affect 11 to 19% of solid tumor cancer patients (Sarkar et al., 2015). Depressive symptoms after diagnosis and treatment occur in 28% of colorectal survivors, 18% of prostate survivors, and 10–25% of breast cancer survivors (Krebber et al., 2013).

Elements of both positive and negative psychological adjustment are experienced concurrently by solid tumor cancer survivors. Andrykowski et al. (2008) showed that psychological health in survivors is determined by both the presence or absence of distress (depression and anxiety) as well as the presence or absence of positive psychological aspects (e.g., greater life appreciation and meaning, heightened spirituality, greater feelings of purposefulness, self-compassion, and social connection). These psychological responses associated with well-being and adjustment, following diagnosis, fall under the concept of “posttraumatic growth”.

Many socioeconomic factors are predictors of HRQOL and psychological distress in solid tumor cancer survivors. Previous studies have shown that survivors with lower household income are at an increased risk for developing and maintaining depression and anxiety disorders compared to survivors with higher income (Zebrack et al., 2007). For example, survivors of stomach cancer with lower monthly household incomes, an issue experienced by many survivors following the costs of treatment, were found to have significantly more depression than survivors with higher income (Han et al., 2013). These results also suggested that the association between low socioeconomic status and depression could possibly be explained in part by the high cost of medical treatment. Further, the impacts of economic stress (e.g., unemployment, medical costs, wage concerns) have been found to be negatively associated with quality of life in low-income women with breast cancer (Ell et al., 2008). The link between severe psychological distress and household income highlights the importance of developing accessible support systems for vulnerable populations like solid tumor cancer survivors that are effective for all survivors, including those with lower household income.

Besides household income, education status has also been found to predict psychosocial well-being and adjustment in solid tumor cancer survivors. In particular, survivors who have a lower educational attainment are also at an increased risk for developing and maintaining depression and anxiety disorders. Eakin et al. (2001) led a study in which education, social support, and spirituality were important predictors of quality of life and levels of anxiety in breast, colon, and prostate cancer patients. In addition, a higher level of education played an important role in higher perceived knowledge concerning psychosocial support, which was associated with less depression and better social support. In solid tumor cancer patients and survivors, higher education has been associated with better psychological health, as survivors with more education may seek additional health and treatment information on their own, or may develop a better understanding of the educational content they are provided (Andrykowski et al., 2008).

Interventions that promote health and encourage educational progress, financial achievement, and social interaction in order to reduce isolation and boost social support, may reduce psychological distress and improve quality of life in solid tumor cancer survivors (Hoffman et al., 2009). Survivorship care interventions have been conducted in efforts to shift the locus of control from external to internal, and consequently improve quality of life as well as reduce depression and anxiety for survivors (Sharif et al., 2017). In one study that utilized a group-based intervention to improve psychological well-being and HRQOL in breast cancer survivors, the intended focus was on supportive expressive therapy and relaxation techniques; more than a 10% improvement in social relationships and HRQOL was found in participants at post-intervention compared to pre-intervention assessment (Dominic et al., 2018). Another

study, in which cancer patients participated in a Mindfulness-Based Stress Reduction (MBSR) intervention, showed a decrease in psychological distress and posttraumatic stress symptoms in patients compared to a wait-list control group (Bränström et al., 2010). These findings strongly suggest that a mindfulness intervention may improve psychological well-being for cancer survivors.

A meditation-based intervention that focuses on fostering compassion and empathy for oneself and others is another possible approach for improving different domains of HRQOL in solid tumor cancer survivors. An intervention using such techniques has already shown to have HRQOL benefits in diverse populations, including breast cancer survivors. Cognitively Based Compassion Training (CBCT®), a meditation program created by Lobsang Tenzin Negi, PhD at Emory University, emphasizes the cultivation of empathy and development of prosocial skills, while increasing awareness of social connection and positive emotions for oneself and others (Pace et al., 2019). CBCT begins with mindfulness training and builds on this to facilitate positively desired emotions, self-compassion, and a sense of social connectivity. In prior studies, CBCT has been found to have beneficial effects on key aspects of HRQOL in breast cancer survivors and their informal caregivers. An improvement in symptoms of depression, fear of cancer recurrence (FCR), and vitality was seen in survivors following 8 weeks of CBCT versus a wait-list control (Dodds et al., 2015). Similarly, an 8-week CBCT program in breast cancer survivors showed a decrease in psychological stress and depression related to FCR, and an increase for self-compassion and common humanity (Gonzalez et al., 2018).

Although interventions have focused mostly on the improvement of HRQOL in survivors, studies have shown that informal caregivers (e.g., close family members, friends) who provide

supportive care also experience significant HRQOL impairments both during the time of and following survivor cancer treatments (Li QP et al., 2013). In prostate cancer survivors, psychological quality of life was affected by their informal caregivers' psychological quality of life, indicating a dyadic interdependence (Segrin et al., 2012). This suggests that including informal caregivers along with survivors in CBCT may promote additional benefit for survivors, as well as benefit for caregivers. Previously, CBCT has not been tested for aspects of HRQOL in breast cancer survivors and their informal caregivers.

The purpose of the current study was to investigate in a preliminary manner how CBCT and a cancer health education (CHE) (i.e., active attention control) impact psychological distress (i.e., both depression and anxiety) in solid tumor cancer survivors when informal caregivers are included with survivors in the interventions, and to understand how household income and educational background may influence how CBCT compares to CHE. We also investigated how household income and educational background are related to psychological distress in survivors before intervention. We hypothesized that survivors with larger household income and more education experience less psychological distress (depression and anxiety) at baseline, before CBCT or CHE. We also hypothesized that both household income and education would influence how CBCT and CHE, inclusive of caregivers, change survivor psychological distress.

Methods

Participants

Forty-one dyads of solid tumor cancer survivors and informal caregivers were recruited for the study and randomized to either CBCT (n = 21 dyads) or CHE (n = 20 dyads) attention

control group. To participate in the study, cancer survivors had to be 21 years or older; they also had to have had a solid tumor cancer diagnosis and completed treatments (e.g., surgery, radiation, chemotherapy), except for hormonal therapies, between 3 months and 10 years prior to beginning the study. In order for informal caregivers to participate, they had to have been named by the cancer survivor and be 18 years or older. Both survivors and caregivers had to be able to speak English, travel to attend intervention classes, and be cognitively oriented in time, place, and person. Additionally, either the cancer survivor or the informal caregiver had to report at least mild anxiety and/or mild depressive symptoms on the PROMIS 4-item scale with a raw score greater than 6. Exclusion criteria for the cancer survivors included being diagnosed with an untreated major mental illness, residing in a nursing home, and participating in an ongoing compassion meditation practice.

Study Design and Interventions

This honors thesis focused on how household income and educational background may influence how CBCT compares to CHE in solid tumor cancer survivors who experience psychological distress (depression and anxiety). Participants completed HRQOL and healthcare adherence assessments before the 8-week interventions (baseline) and again after interventions. Over the course of 8 weeks, there was a total of 8 CBCT and 8 CHE sessions, with one session per week. Participating dyads attended weekly classes together, in which each session lasted 120 minutes for CBCT and 90 minutes for CHE.

The CBCT intervention group consisted of six modules, in which the skills learned each week built upon each other (Pace et al., 2019). Module I, Resting in a Moment of Nurturance and Attentional Stability and Clarity, focused on understanding compassion and developing

sustained attention, which was done by learning to retain focus and respond with greater equanimity. In Module II, Cultivating Insight into the Nature of Mental Experience, participants learned mindfulness of the present and how this practice develops a flexible responsiveness to inner experience, insight into habitual mental patterns, and increased calmness of the mind. Module III, Self-compassion, taught dyads that these mental patterns and inner perspectives contribute to well-being. Following difficult life circumstances, the practitioner can shift one's inner attitudes and view kindness towards oneself, and this works to replace negative and damaging thought patterns with more constructive and realistic viewpoints. In Module IV, Cultivating Impartiality, practitioners considered categories of in-groups and out-groups, and how they are artificial and fluctuating. All humans share the commonality of the desire for personal fulfillment and the wish to avoid distress. Following this, Module V, which was Appreciation and Affection for Others, focused on an interconnected ecosystem and a sense of gratitude and affection towards others. Finally, Module VI, Empathy and Engaged Compassion, discussed the perspectives of global distress shared by humanity. This invokes an empathetic response and orients one's core motivation towards the alleviation of the suffering of others. See Appendix 1 (provided by Dr. Pace) for additional details of CBCT sessions. Alongside weekly sessions, dyads were encouraged to meditate a minimum of 10 minutes per day with guided audio recordings. In addition, participants were asked to complete a CBCT practice log.

The CHE intervention group consisted of different topics of cancer health discussion (Pace et al., 2019). During week 1, which was cancer advocacy, the group discussed how to advocate for one's own survivorship along with others' experiences with survivorship. They also discussed wellness relating to current events about cancer. In week 2, health through the

lifespan, participants focused on the definition of cancer; they were taught the importance of maintaining a healthy lifestyle in order to avoid an increased risk of mortality. Weeks 3 and 4, nutrition, taught the basic components of food necessary, healthy diet tips, serving sizes, and factors that contribute to unhealthy eating. Other topics brought up included nutrition related to obesity, healthy serving sizes, and tips for maintaining a healthy diet. In week 5, the importance of physical activity in both survivors and non-cancer survivors was emphasized. This module provided an overview of developing a personal fitness plan and practicing tips for exercise. In week 6, the importance of sleep health was taught. Participants also learned tips for diet to promote healthy sleep. Week 7 comprised of stress education and the impacts on health. This module provided coping strategies for stress (e.g., adequate sleep, physical activity, diet). Lastly, week 8 was a discussion concerning mental health and social support. This included topics of mental health disorders (e.g., depression, anxiety disorders, eating disorders) that many survivors and caregivers experience. The benefits of social connection and the role it plays in health was also emphasized. See Appendix 2 (provided by Dr. Pace) for additional details of CHE sessions.

Outcomes and Analytic Plan

PROMIS scales were selected to assess depression and anxiety symptoms (Kroenke et al., 2014). Depression and anxiety were measured using PROMIS-short forms 8-items both before and after the intervention. For this honors thesis, the relationship between household income or education and psychological distress (i.e., depression and anxiety) in survivors at baseline before CBCT or CHE was analyzed using descriptive statistics and one-way analysis of variance (ANOVA). Outcomes of whether or not there was a difference in psychological distress

after intervention between survivors randomized to CBCT or CHE that depended on household income or education, when controlling for baseline psychological distress, was analyzed using descriptive statistics and two-way analysis of covariance (ANCOVA).

Results

Do solid tumor cancer survivors with larger household income have less psychological distress (depression and anxiety) at baseline, before CBCT or CHE?

One-way ANOVAs were run to examine the relationship between household income (independent variable) and psychological distress (i.e., depression and anxiety) (dependent variables). Depression scores tended to be different between household income groups (i.e., \$100,000 and above, \$40,000 to \$99,000, or \$39,999 and under) ($F [2,20.3] = 2.89, p = 0.079$). Post hoc analysis, using a Tukey test, indicated that those with household incomes of \$100,000 and above had less depression than those with household incomes of \$39,999 and less ($p = 0.041$) (see Figure 1). Anxiety scores were not different between household income groups ($F [2,21.3] = 1.85, p = 0.181$).

How does household income matter (or not) for the way that CBCT or CHE impacts psychological distress (depression and anxiety)?

Two-way ANCOVA was used to determine whether there was a difference in psychological distress (depression or anxiety) after intervention between survivors randomized to CBCT or CHE that depended on household income (i.e., \$100,000 and above, \$40,000 to \$99,000, or \$39,999 and under), when controlling for baseline psychological distress. For depression, ANCOVA did not reveal a significant main effect of intervention ($F [1, 36] = 1.494, p = 0.23$) or

household income ($F [2, 36] = 0.053, p = 0.95$), nor an interaction between household income and intervention group, ($F [2, 36] = 1.227, p = 0.31$) indicating that household income did not modulate the effect of CBCT versus CHE on depression (see Figure 2). For anxiety, ANCOVA did not reveal a significant main effect of intervention ($F [1, 36] = 1.29, p = 0.27$) or an interaction between household income and intervention group, ($F [2, 36] = 0.97, p = 0.91$). However, there was a trend main effect of household income on anxiety ($F [2, 36] = 2.456, p = 0.103$), suggesting that regardless of intervention group, anxiety varied between household income groups (see Figure 3).

Do solid tumor cancer survivors with more education have less psychological distress (depression and anxiety) at baseline, before CBCT or CHE?

One-way ANOVAs were run to examine the relationship between education (independent variable) and psychological distress (i.e., depression and anxiety) (dependent variables).

Depression scores were not different between education groups (i.e., graduate, bachelors, or elementary/middle school/high school/vocational/technical) ($F [2,23.2] = 1.05, p = 0.367$).

However, anxiety scores tended to be different between education groups ($F [2,20.8] = 5.20, p = 0.015$). Post hoc analysis, using a Tukey test, indicated that those with graduate level education had less anxiety than those with elementary, middle school, high school, and/or vocational/technical level education ($p = 0.009$) (see Figure 4).

How does education matter (or not) for the way that CBCT or CHE impacts psychological distress (depression and anxiety)?

Two-way ANCOVA was used to determine whether there was a difference in psychological distress (depression or anxiety) after intervention between survivors randomized to CBCT or

CHE that depended on education (i.e., graduate, bachelors, or elementary/ middle school/ high school/ vocational/technical), when controlling for baseline psychological distress. For depression, ANCOVA did not reveal a significant main effect of intervention ($F [1, 36] = 0.16, p = 0.69$) nor an interaction between education and intervention group, ($F [2, 36] = 1.587, p = 0.22$). However, there was a trend main effect of education on depression ($F [2, 36] = 2.393, p = 0.109$), suggesting that regardless of intervention group, depression varied between education groups (see Figure 5). For anxiety, ANCOVA did not reveal a significant main effect of intervention ($F [1, 36] = 0.489, p = 0.49$), a significant main effect of education ($F [2, 36] = 1.772, p = 0.187$) or an interaction between education and intervention group, ($F [2, 36] = 0.247, p = 0.78$) (see Figure 6).

Discussion

This study worked to determine how household income and education influence how two different interventions (CBCT or CHE [an active attention control group]) impact psychological distress (depression and anxiety) in solid tumor cancer survivors. Survivors learned CBCT and CHE along with an informal caregiver. The study also determined how household income and education are associated with psychological distress in solid tumor cancer survivors before CBCT or CHE. Self-report questionnaires were used to assess distress both before and after the 8-weeks interventions (CBCT or CHE). The data collected for survivors was used to determine whether or not depression and anxiety scores were different between household income and education groups at baseline, before intervention. Survivor data was also used to determine whether or not there was a difference in depression and anxiety after

intervention, that depended on household income or education, when controlling for baseline psychological distress. For both depression and anxiety, this was reflected as significant main effects of intervention, significant main effects of household income or education group, and interactions between household income or education and intervention group.

This study found that survivor depression scores were different between household income groups at baseline, before intervention. Survivors with household incomes of \$100,000 and above had less depression than those with household incomes of \$39,999 and less. The implication of this result is that solid tumor cancer survivors with larger household income may experience less depression independent of an intervention. However, anxiety scores were not different between household income groups at baseline and before intervention. For education, results showed that although survivor depression scores were not different between education groups at baseline before intervention, survivor anxiety scores were different between education groups. Survivors with graduate level education had less anxiety than those with elementary, middle school, high school, and/or vocational/technical level education. These findings suggests that solid tumor cancer survivors with more education experience less anxiety at baseline, before CBCT or CHE.

With respect to an impact of the interventions on distress that was related to these demographic factors when controlling for baseline psychological distress, no significant main effects of intervention or interactions between household income and intervention group were revealed for either depression or anxiety. However, a trend main effect of survivor household income group on anxiety suggested that survivor anxiety after intervention varied between household income groups, regardless of intervention group. This indicates that while household

income does not influence how CBCT versus CHE may change survivor anxiety, survivors with lower household income may have different anxiety than survivors with higher household income. When controlling for baseline psychological distress, no significant main effects of intervention or interactions between education and intervention group were revealed for either depression or anxiety. However, a trend main effect of survivor education on depression suggests that survivor depression, after intervention, varied between education groups regardless of intervention group. This indicates that education may not influence how CBCT vs CHE change survivor depression. However, survivors with less education may have different depression than survivors with more education.

One limitation of the study was that household income data for survivors living alone and household income data of survivors living together with others (including, perhaps, the informal caregiver who participated in the study with them) were combined together to determine household income group. Another limitation was that the study participants consisted of a mixed group of solid tumor cancer survivors, all with different cancer treatment backgrounds and personal survivorship journeys. To account for these differences, this study could be replicated while focusing on survivors of one type of solid tumor cancer (e.g., breast cancer).

The findings of how survivor household income was related to anxiety and how survivor education was related to depression underscore the importance of these demographic characteristics for survivor well-being, and how these characteristics should be taken into account when developing interventions intended to change psychological distress in survivors and their informal caregivers. Previously, survivors with lower household income and

educational background have been shown to be at an increased risk for developing and maintaining depression and anxiety compared to higher income and education survivors (Zebrack et al., 2007). Understanding how and why socioeconomic factors are predictors of psychological distress in solid tumor cancer survivors could be a critical component of an intervention program's effectiveness. More work in this area may find that adequately addressing these demographic characteristics when designing and testing interventions to promote survivor HRQOL may result in increased intervention effectiveness.

In conclusion, the study found that following the intervention anxiety tended to vary between household income groups and depression tended to vary between education groups in solid tumor cancer survivors, regardless of intervention group. The influence of household income and education on the intervention's impacts on depression and anxiety in survivors remains to be determined. Although we did not find evidence suggesting that household income and education were involved in effectiveness of the interventions, it still may be that household income and educational background may influence how CBCT compares to CHE in solid tumor cancer survivors and their informal caregivers. Future studies should investigate this possibility.

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Figure 1. At baseline, depression in three different household income groups.

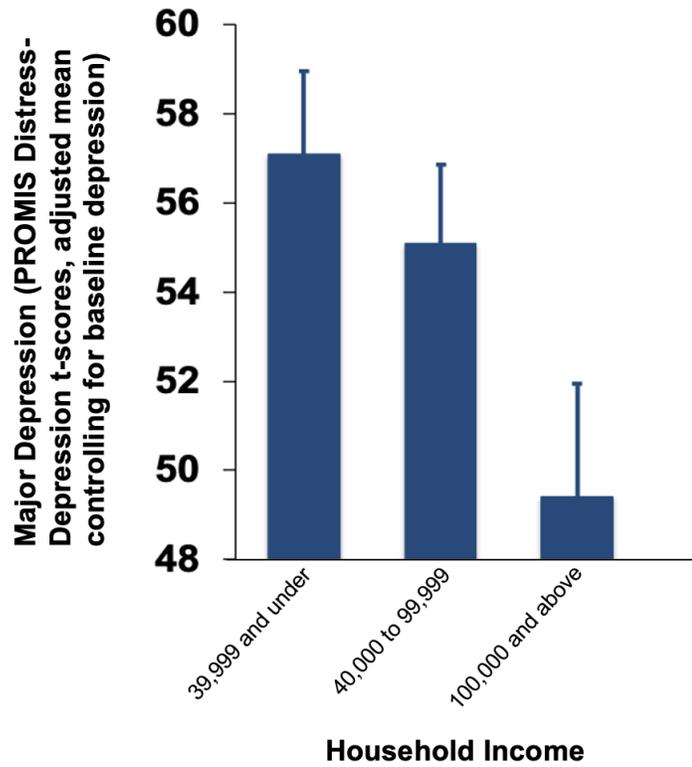


Figure 2. CBCT versus CHE, depression in three different household income groups.

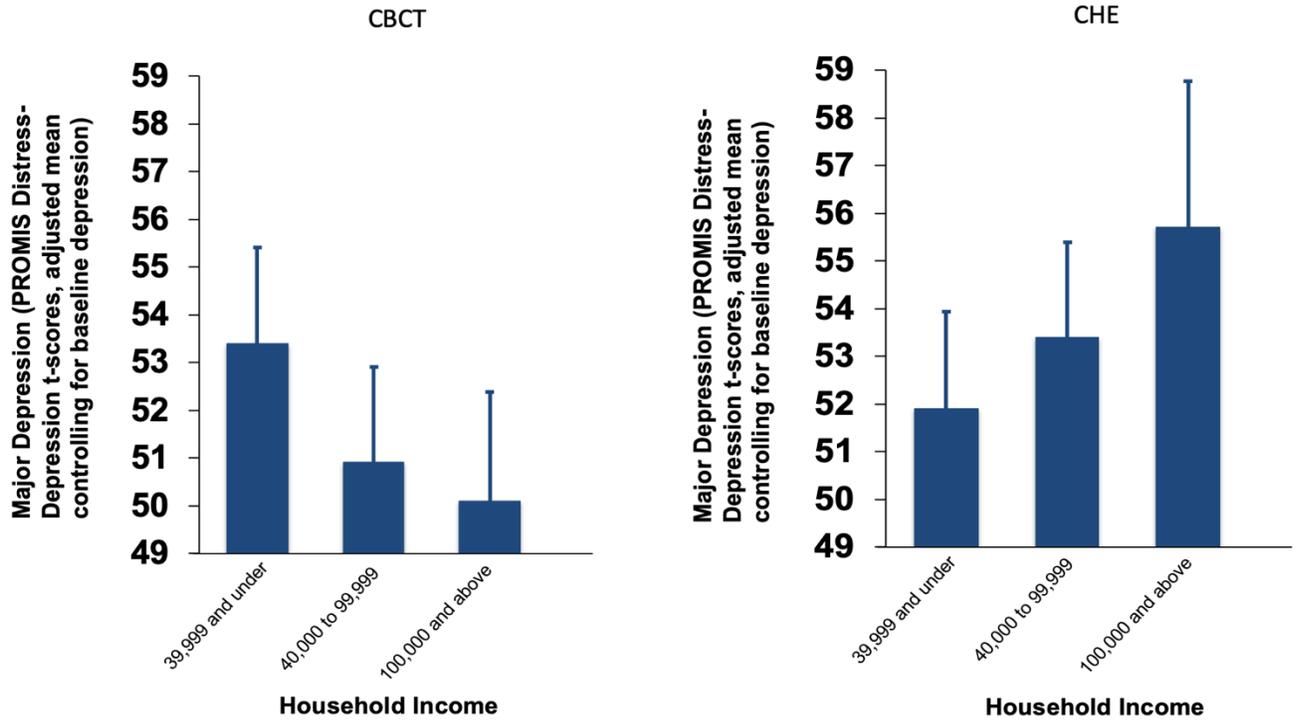


Figure 3. CBCT versus CHE, anxiety in three different household income groups.

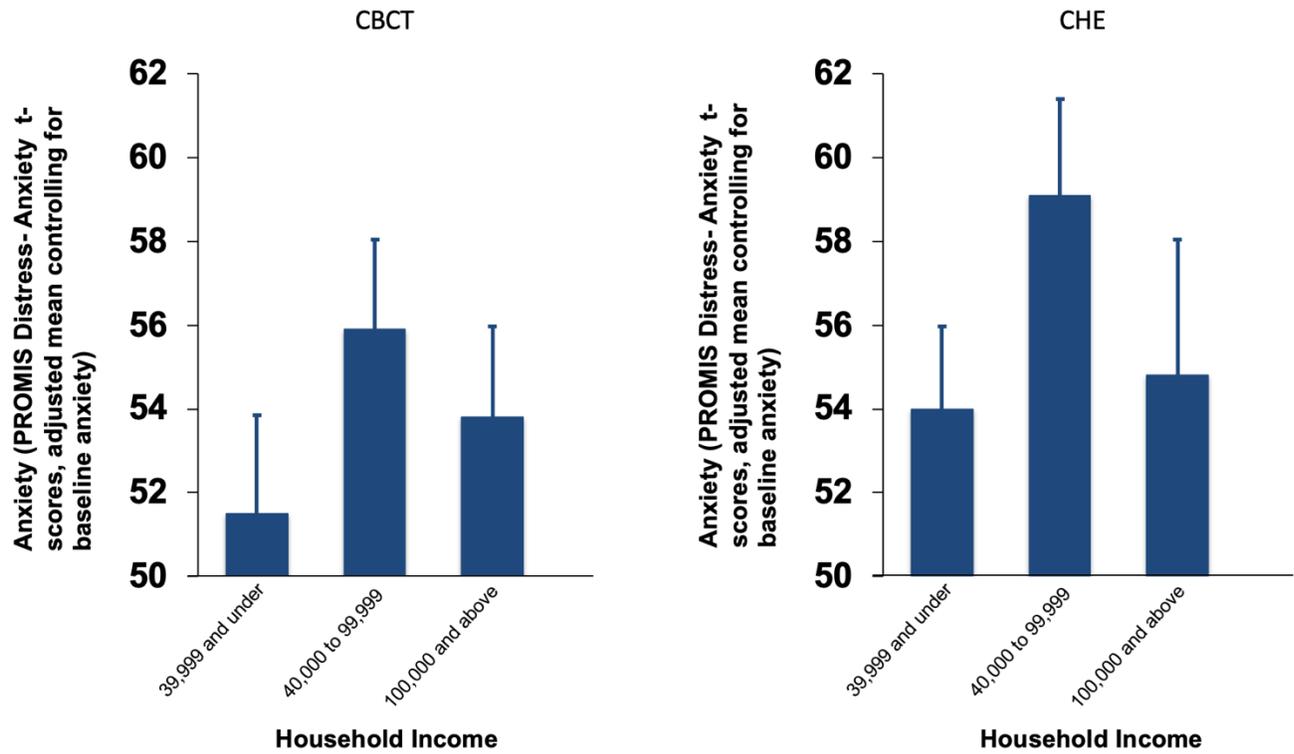


Figure 4. At baseline, anxiety in three different education groups.

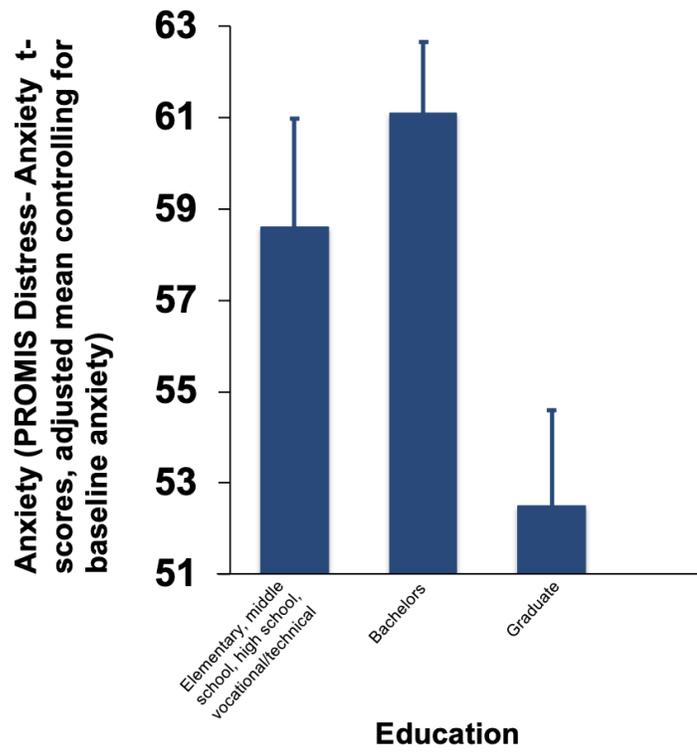


Figure 5. CBCT versus CHE, depression in three different education groups.

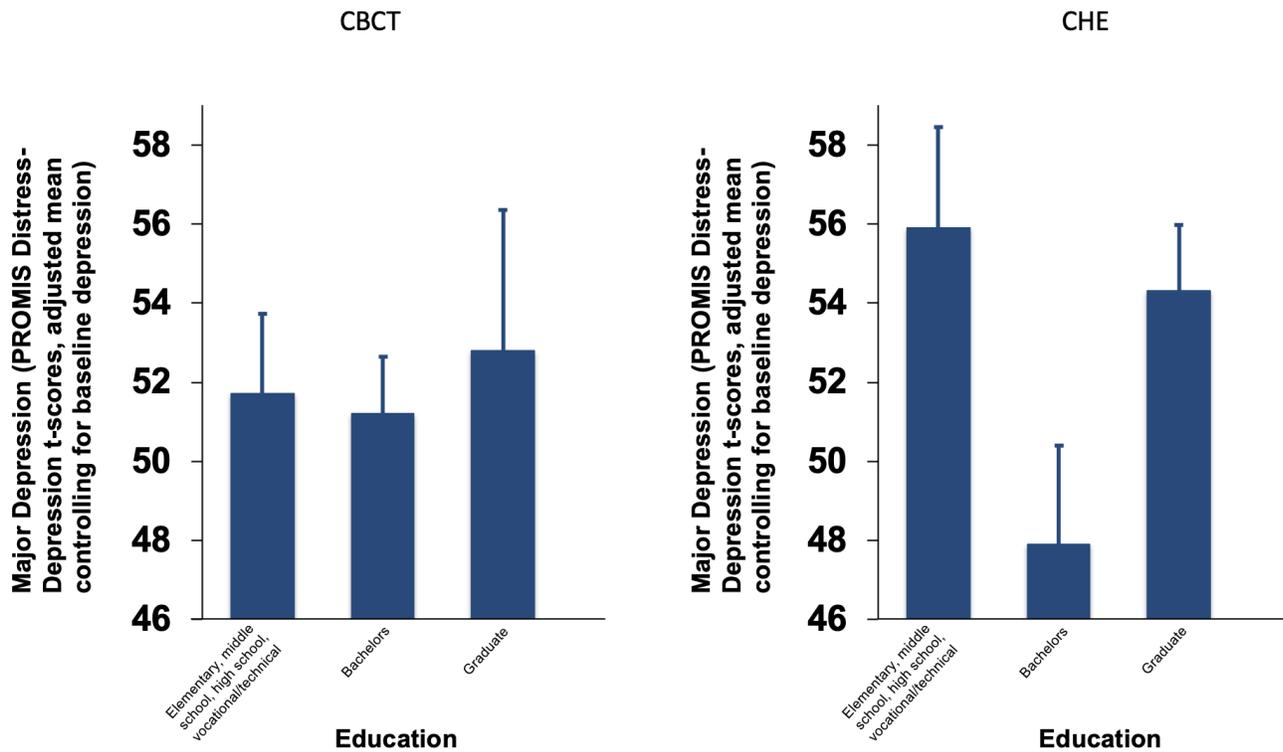
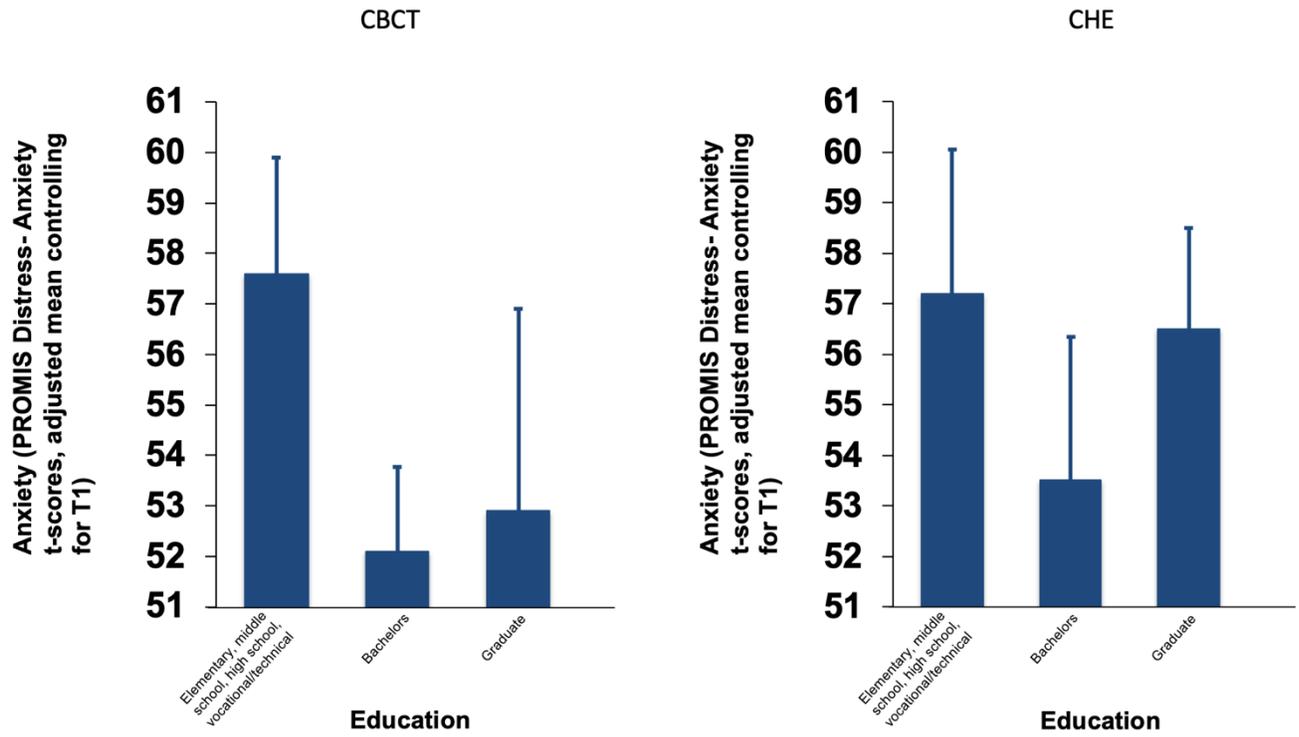


Figure 6. CBCT versus CHE, anxiety in three different education groups.



Appendix 1. Description of Cognitively-Based Compassion Training published in Pace et al., 2019 (reproduced here with permission).

Week 1: Resting in a Moment of Nurturance and Developing Attentional Stability and Clarity (Module I). Physical relaxation and focused attention training aid in mental stability and attention regulation and lead to concentration and later clarity of mental contents, states, and processes. Week 1 reviews confidentiality, defines compassion and its benefits, provides instruction in correct meditation posture, diaphragmatic breathing, and relaxation of muscle tension. This is followed by visualizing a remembered moment of nurturance that recalls the experience of compassion by a caregiver or caring other to prime the practitioner in feelings of safety and security. Last, the first mindfulness meditation practice (*shamatha*) is introduced and uses the breath as an object to focus attention for increasingly longer periods of time. These opening practices are the starting point of all subsequent CBCT meditation practice

Week 2: Insight into the Nature of Mental Experience (Module II). The felt experience of compassion is one of kindness, connection, and unconditional positive regard. Cognitions, often with a negative emotional charge, are impermanent and transient, change rapidly, and can be observed as such. Week 2 reiterates the opening practices of the first week and introduces the second mindfulness meditation practice (*vipassana*) to develop open awareness of subjective experience through non-judgmental, non-reactive observation of the fluctuating (and impermanent) nature of thought, sensory experience, and emotion. This practice aids the participant in distinguishing internal mental experiences and external reality and creates a greater gap between an experience and the reaction to that experience, thus allowing for more

deliberate choice in response or behavior. The technique is included in all subsequent CBCT meditation practice.

Week 3: Self-compassion (Module III). Before compassion can be expressed to others, CBCT holds that one must first understand and reduce causes of distress in oneself, as well as attune to a sustained attitude of kindness toward the self. The assumption that all people share the common human desires for happiness, well-being, and freedom from distress is discussed, yet both external and internal conditions can interfere. Thus, causes of both external and internal interference need to be identified, along with learned perceptions and cognitive appraisals that accompany them. Concordant attitudes (e.g., narrow self-centeredness and self-preoccupation) and behaviors (e.g., [egoic] attachment and aversion, rumination, addiction, and avoidance) that can sustain faulty appraisals and that are potentially harmful require insight, reappraisal, and corrective emotional experience. Introspection, resolve, and commitment are then required for ongoing improvement. Week 3 introduces analytic meditation practice (as opposed to mindfulness practice) to identify and assess conditioned and habitual patterns of cognitions and appraisals contributing to distress to promote a resolution to correct these habits as they are identified.

Week 4: Developing Equanimity and Impartiality (Module IV). CBCT holds that in the universal desire for happiness, well-being, and freedom from distress, all individuals are alike; there are no differences among them (common humanity). Partiality and bias not only harm those regarded as adversaries or enemies, but also those regarded as loved ones, since bias ultimately distorts interactions with others. Week 4 counters the participants' learned attitudes of prejudice and partiality through continuing reflection on the common human desires for

wellbeing and freedom from distress. Through guided analytical meditation practice, recognition of this commonality is promoted by visualizing people in the categories of friend, adversary, and stranger with the goal of increasing identification with them (and thus empathic understanding) and of reducing indifference or excessive liking or disliking of some over others.

Week 5: Appreciation and Gratitude for Others (Module V). CBCT holds that all people exist in an interconnected system, a web of interdependence for all needed resources and benefits. Recognition of this interdependence, in particular the high degree of dependence one's well-being has on the efforts others, decreases perceptions of interpersonal distance and social isolation (disconnection) and can lead to a sense of appreciation and gratitude for the beneficence of others, both familiar and unknown, as well as the hidden benefits that are often derived from adversaries. Week 5 explores interconnection and interdependence and the appreciation of others. Analysis and reflection during meditation examine the benefits received from others, even those received from adversaries. Further meditation practice guides the participant in visualizing extending appreciation and gratitude to an ever-widening circle of others.

Week 6: Affection (Module V). The CBCT model contends that experiences of appreciation and gratitude lead to feelings of endearment, or warm affection. Warmth, together with identification (see Module IV) stimulates empathy, or the recognition that others too, experience distress and its causes. Week 6 introduces affection for others based on their beneficence and also their similarity to oneself in wanting well-being yet often experiencing distress. Relating to others with profound affection and endearment then become the preconditions for empathy; in turn, empathy can catalyze compassion. Meditative reflection is

guided to recall the kindnesses of others, their similarities to oneself (“just like me”), and to strengthen endearment and affection towards them. Further meditative reflection is guided on the drawbacks of egoistic attitudes to lessen self-centeredness.

Week 7: Empathetic Concern and Engaged Compassion (Module VI). Once insight into the causes of distress (Week 3) is combined with affection toward and empathic understanding of others (Week 6), CBCT holds that compassion naturally ensues. Week 7 focuses on sustaining the spontaneous empathetic concern that naturally arises when these two conditions are present: (1) holding someone with deep affection and warm-heartedness and (2) attuning to their dissatisfaction, distress, and vulnerability. To sustain the emerging motivation to alleviate their distress (while simultaneously acknowledging one’s limitations and boundaries via self-compassion), Week 7 provides instruction to attune to this compassionate love as an image of energy or light, radiating outward and including first our family and friends and then increasingly others. Instruction guides the practitioner in wishing compassion as a desirable thought of “How wonderful it would be if others were happy and free from dissatisfaction”.

Week 8: Empathetic Concern and Engaged Compassion (Module VI). When a genuine desire for compassion is deepened and accompanied with a determined motivation to help others, when possible, the final step is of CBCT is considered to be activated or engaged compassion. Continued practice helps strengthen all of the prior skills and insights meant to support to an embodied compassionate responsiveness toward others. In Week 8, class exercises promote group closure, and a final comprehensive meditation practice is conducted. The same guided meditation is used as in Week 7, but more emphasis during reflection is placed on phrases that promote a move from simply wishing others happiness and freedom

from distress to a motivational readiness to assist whenever possible (“May they be happy and free from dissatisfaction”).

Appendix 2. Description of Cancer Health Education published in Pace et al., 2019 (reproduced here with permission).

Week 1: Cancer Advocacy. This module begins with a discussion on cancer advocacy that includes the definition of cancer advocacy, how to be an advocate for your own cancer care throughout survivorship, how to be an advocate for others with cancer, and how to approach public interest advocacy for cancer. This module also discusses current events related to cancer, trends about cancer diagnoses, and the latest science and research about cancer (e.g. the Cancer Moonshot). At the conclusion of this module participants will have a broad understanding of the major themes of cancer advocacy, the significance of cancer advocacy for promoting the wellness of the self, family, and society, and cancer research.

Week 2: Health Through the Lifespan. This module provides an overview of the biology of cancer, how cancer is defined, how cancer is treated, and side effects of cancer treatments. Also reviewed are topics relevant to maintaining a healthy lifestyle over the lifespan including leading causes of mortality besides cancer, brain and mental health, and health screenings. At the conclusion of this module participants will be familiar with the leading causes of death and avoidable causes of death, the role of general health habits, importance of health screenings, and the relevance of mind-body connections for health and cancer survivorship.

Weeks 3 and 4: Nutrition. The first week of this module focuses on basic components of food such as carbohydrates, proteins, and fat. Whole grains, hydration, and caffeine are also discussed as well as essential nutrients and dietary fiber. The second week provides an overview of healthy diet tips, serving sizes, and factors that contribute to unhealthy eating. Key topics in the second week include nutrition related to obesity, healthy serving sizes, nutritional

“trade-offs”, healthy grocery shopping, and tips for maintaining a healthy diet. At the conclusion of this module, participants will have an understanding of food components as well as basic strategies to maintain good nutrition to promote health, including in cancer survivorship.

Week 5: Physical Activity. This module reviews the importance of physical activity in survivorship but also the importance of physical activity for the wellness of non-cancer survivors across the lifespan. This module provides an overview & explanation of the basic components, principles, and health benefits of physical fitness. Information for developing and implementing a personal fitness plan and goals are also presented. The module concludes with practical tips for exercise, e.g., staying fit while traveling. Also addressed are consequences of a lack of exercise (e.g., obesity), health benefits of exercise (e.g., mental wellness, healthy aging, cardiovascular wellness), lactic acid, muscle burning and soreness, planning an exercise schedule, and exercise nutrition. At the conclusion of this module, participants will have an understanding of exercise basics, the relationship between exercise and wellness, and how to better incorporate exercise in their own lives.

Week 6: Sleep. This module provides an overview of the sleep cycle, the benefits of sleep, common sleep disorders, and tips for better sleep. Topics considered also include the neuroscience mechanisms of sleep, common sleep disorders, and tips for diet to promote healthy sleep including for survivors. By the end of the module participants will understand the mechanisms of sleep, why sleep is important for good health (including in survivorship), and how to get better sleep.

Week 7. Stress. This module reviews the concept of stress and how stress is known to impact health, including the biological mechanisms involved. Topics discussed include the definition of stress, a review of “America’s most stressed out cities”, types of stress (distress and eustress), negative effects of chronic stress, and basic ways to cope with stress. Of note, this module will not provide participants with a comprehensive stress management plan. Instead, the coping strategies for stress considered will be limited to general topics such as good sleep, physical activity, and diet (to synergize with earlier CHE modules).

Week 8. Mental Health and Social Support. This module provides a broad overview of mental health disorders (e.g. depression, anxiety disorders, eating disorders), as well as disorders that many survivors and caregivers experience. The health-related consequences of loneliness and benefits of social interaction are also reviewed. This module also introduces the concept of social capital, and also explores the impact of social networking sites. By the end of the module participants will have a general understanding of mental health disorders and how social contact can promote wellness for survivors and caregivers.