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Amanda J. Shallcross ND, MPH, Pallavi D. Visvanathan PhD, Rochelle McCauley MPH, Alex Clay BA & Peter R. van Dernoort BS

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ARTICLE

The effects of the CLIMB[®] program on psychobehavioral functioning and emotion regulation in children with a parent or caregiver with cancer: A pilot study

Amanda J. Shallcross, ND, MPH^a, Pallavi D. Visvanathan, PhD^b,
Rochelle McCauley, MPH^b, Alex Clay, BA^b, and Peter R. van Dernoot, BS^c

^aSchool of Medicine, New York University, New York, NY, USA; ^bOMNI Institute, Denver, CO, USA;

^cThe Children's Treehouse Foundation, Denver, CO, USA

ABSTRACT

This study evaluated the psychobehavioral benefits of the Children's Lives Include Moments of Bravery (CLIMB[®]) intervention in 45 children (aged 6–11) with a parent/caregiver with cancer. Parent/caregiver reports of psychobehavioral functioning indicated significant decreases in children's emotional symptoms and marginally significant reductions in conduct problems. Child reports of emotion regulation indicated significant increases in emotion awareness, significant decreases in emotion suppression, and nonsignificant increases in emotion-focused coping and dysregulated expression. Parents/caregivers and children reported high satisfaction with CLIMB[®]. Results suggest CLIMB[®] is a promising intervention for improving psychobehavioral functioning and emotion regulation in children with a parent/caregiver with cancer.

KEYWORDS

children; CLIMB[®];
psychobehavioral
functioning; emotion
regulation; parent or
caregiver with cancer

Introduction

Nearly 25% of individuals diagnosed with cancer are between the ages of 25 and 54 (United States Department of Health and Human Services, 2011), which are prime childbearing and parenting years. In turn, approximately 2.8 million children under the age of 18 are faced with the challenge of coping with a parent with cancer (Weaver, Rowland, Alfano, & McNeel, 2010). Within the next two decades, this estimate is expected to rise significantly due to the increasing incidence of cancer diagnoses in younger age groups (e.g., colorectal cancer) (Singh, Taylor, Pan, Stamos, & Zell, 2014) and improved treatments that prolong survival. Although some evidence suggests that children can exhibit resilience to the threat of losing a parent (Jeppesen, Bjelland, Fossa, Loge, & Dahl, 2013), other studies indicate that children with a parent with cancer experience significant maladjustment (Huizinga et al., 2011). Maladjustment results not only from the fear of losing a parent but

CONTACT Pallavi D. Visvanathan, PhD ✉ visvanathan@mindfultherapynyc.com 📍 276 Fifth Avenue, Suite #905,
New York, NY 10001, USA.

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also because of the disruption of family roles and routines and the temporary loss of the parent caused by symptoms of the disease and side effects of treatment (Grant & Compas, 1995). Additionally, emotion regulation and problem-solving skills follow an age-linked trajectory whereby children, versus adults, have fewer coping strategies upon which to rely in the face of acute and chronic life stress (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Thus, children with a parent or caregiver with cancer frequently experience elevated anxiety, depression, aggression, and somatic complaints compared with peers from control or normative groups (Edwards et al., 2008; Visser et al., 2007; Welch, Wadsworth, & Compas, 1996).

Despite the risk for maladjustment and psychological distress, surprisingly few empirically validated psychosocial interventions exist for children with a parent or a caregiver with cancer. Among the empirically tested interventions in the literature, four noteworthy limitations constrain what is currently understood about the clinical significance of these programs.

First, the vast majority of interventions have been evaluated using strictly qualitative methodology (Niemela, Hakko, & Rasanen, 2010). Although case reports, focus groups, and individual interviews have noteworthy strengths, purely qualitative data are limited by several factors including, dependence on individual skills of the researcher and associated personal bias; response bias of the participant due to researcher's role in data collection, and compromised scientific acceptance due to difficulties in achieving scientific rigor. Overcoming the latter limitation, in particular, is a critical step toward making psychosocial interventions for children with a parent/caregiver with cancer widely available, affordable, and scalable at the national level.

Second, the availability of published information about the theoretical and empirical considerations used to develop extant interventions is extremely scarce. Understanding theoretical and empirical approaches to psychosocial treatment development is imperative for establishing a mechanistic model of effects and for providing a framework that can guide modifications to other interventions to enhance their efficacy.

Finally, extant interventions lack manualized and structured protocols and a clearly defined training program for intervention facilitators. These characteristics limit prospects for standardization, rigorous scientific evaluation, and, in turn, widespread clinical acceptability and sustainability.

Two notable intervention studies that have addressed several of aforementioned limitations are the enhancing connections study (Lewis, Casey, Brandt, Shands, & Zahlis, 2006) and the Children's Lives Include Moments of Bravery (CLIMB[®]) intervention study in Northern Ireland (Semple & McCaughan, 2013). The investigation of the enhancing connections intervention included qualitative and quantitative analyses, and the intervention was developed based on previous research and several theoretical frameworks including coping and social cognitive theories. The enhancing connections intervention additionally uses a standardized

component-based protocol that can be replicated by other clinicians and researchers. This intervention, however, was developed specifically to address sources of distress in both mothers and children affected by maternal breast cancer. It was also designed to be delivered in a one-on-one context. These characteristics limit the generalizability and scalability of this intervention because the challenges of coping with breast cancer may be unique compared with other types of cancer and, as a one-on-one intervention, enhancing connections has a limited reach and may be less cost effective and accessible compared with a group-based approach.

Unlike enhancing connections, the CLIMB[®] intervention is group based and focuses solely on children with a parent or caregiver diagnosed with heterogeneous cancers, as opposed to one specific diagnosis (i.e., maternal breast cancer). CLIMB[®] is a manualized intervention based largely on social cognitive theory (Bandura, 1986) and involves evidence-based approaches including emotion labeling, normalization, and expression. Additionally, the developers of CLIMB[®] provide training workshops for oncology professionals (social workers, nurses, family support workers, psychologists) to facilitate the implementation of this intervention program at local cancer treatment centers. Indeed CLIMB[®] is one of the only child-focused interventions that is delivered internationally. Collectively, these features make CLIMB[®] one of the most promising and scalable psychoeducational interventions for children with a parent or caregiver with cancer.

However, our understanding of the effects of CLIMB[®] is limited because there has been no quantitative evaluation of its effects. Extant qualitative data are based on one small-scale study with a restricted sample size of seven children from a single site in Northern Ireland (Semple & McCaughan, 2013). Thus, the question remains: Is CLIMB[®] effective for improving psychological functioning among children with a parent or caregiver with cancer?

The goal of the present study was to conduct a multisite, quantitative evaluation of the effects of CLIMB[®] on parent/caregiver report of children's emotional symptoms and conduct problems (i.e., psychobehavioral functioning) and children's report of four domains of emotion regulation using a pre-postdesign. Secondary outcomes included a quantitative and qualitative evaluation of parent and child satisfaction with the CLIMB[®] intervention. We hypothesized pre to postimprovements on all outcomes (e.g., psychobehavioral functioning and emotion regulation) as well as high levels of satisfaction with the CLIMB[®] intervention program.

Method

Participants

The current study is focused on evaluating the psychosocial impact of the CLIMB[®] program on 6–11-year old children who have a primary caregiver with cancer. Although CLIMB[®] is often implemented with children within a wide age range, the program was initially developed for 6–11 year olds. Thus, for this pilot efficacy study, impact of the CLIMB[®] program was assessed for children between the ages

of 6 and 11, who are aware that their parent or caregiver has cancer. The primary caregiver may be a grandparent, an uncle or aunt, or an unrelated adult, but by definition is someone who bears (or has borne) significant caretaking responsibility for the child. No changes were made to preexisting recruitment strategies or criteria for service delivery at each of the participating sites. Of all children served at participating sites, data from only those who met inclusion criteria were included in this pilot study.

A total of 50 children who met study criteria were enrolled and provided consent for participation. Five of these children were excluded from the study because they did not provide postintervention data. Thus, the final sample is comprised of 45 children.

Procedure

Five medical centers (Table 1) that deliver the CLIMB[®] program and met minimum criteria for experience and training with the program agreed to participate in the current evaluation. Participating sites were required to have administered CLIMB[®] for at least 1 year and to at least two cohorts of children prior to inclusion in the current study. Additionally, at least one of the site's group facilitators was required to have attend a training provided by The Children's Treehouse Foundation. Study coordinators at each site collaborated with researchers to obtain approval for the study from their overseeing Institutional Review Boards. Group facilitators at each site were trained in data collection and human subject protection protocols. Protocols included obtaining written informed consent from parents/caregivers and assent from children prior to the start of the first group session.

Parents and caregivers completed a preassessment survey packet prior to the start of the first group session and a postassessment survey packet at the end of the last group session. The preassessment packet included survey items on sociodemographic variables as well as a measure of psychobehavioral functioning. The postassessment packet included a measure of parent's report of children's psychobehavioral functioning and parents' perceived satisfaction with the CLIMB[®] program.

Table 1. Fidelity ratings by participating site.

Site	# Children served	Range	Mean	SD
The Cancer Center at Cookeville Regional Medical Center, Cookeville, Tennessee	5	4.92–5.00	4.95	0.05
Marshfield Clinic Cancer Care at Sacred Heart Hospital, Eau Claire, Wisconsin	9	3.89–4.76	4.53	0.43
The University of Texas MD Anderson Cancer Center, Houston, Texas	16	4.42–4.92	4.76	0.23
University of Colorado Cancer Center, Denver, Colorado	3	4.61–4.79	4.70	0.13
The University of Maryland Upper Chesapeake Health, Kaufman Cancer Center, Bel Air, Maryland	12	4.95–5.00	4.96	0.03

Child participants completed a presurvey at the start of the first group session and a postsurvey at the end of the last group session. The pre and postsurveys assessed four domains of emotion regulation. Children also completed a satisfaction survey at the end of the last group session.

CLIMB[®] intervention

The CLIMB[®] intervention, developed by Sue P. Heiney, PhD, RN, CS, FAAN, Elizabeth P. Heiney, MS, and Wendy Peterson, APRN for The Children's Treehouse Foundation, was designed as a 6-week psychosocial and emotional support intervention for 6–11-year old children who have a parent or caregiver with cancer. Weekly 90-min sessions involve a small group art and play activities led by facilitators who help children learn basic information about cancer as well as to increase understanding of feelings related to the diagnosis, communicate feelings to others, and to cope with these feelings. Sessions are oriented around the following primary goals: decrease isolation by sharing cancer story with other children; increase knowledge about cancer and its treatment; normalize feelings of sadness, assist child to identify strengths, and normalize anxiety; assist child to express and manage anger appropriately; facilitate communication with the parent who has cancer. The Children's Treehouse Foundation conducts regular trainings for psychologists, social workers, nurses who are affiliated with cancer centers and are interested in starting psychosocial support groups for children of adults with cancer. To date, The Children's Treehouse Foundation has conducted 25 trainings for more than 500 professionals, and the intervention is delivered in 101 cancer centers in 33 states in the USA and seven other countries, including Australia, Japan, Ireland, Northern Ireland, Taiwan, China, and Canada.

Cohort structure and format

A total of 16 cohorts of children received the intervention across the five sites participating in this project. Few sessions per cohort ranged from 4 to 6 and each session ranged in the duration from 60 to 125 min.¹ Each cohort was facilitated by either 2 staff members or 1 staff member and 1 volunteer. Staff members identified as psychologists, social workers, and/or nurses.

Measures

Demographic variables

On the preassessment survey, caregivers provided information about participating children including age and grade, gender, ethnicity, the family member with cancer, time since the child was made aware of the cancer diagnosis, and whether the child had received behavioral or mental health treatment from another provider.

Psychobehavioral functioning

Caregivers provided pre and postinformation about children's emotional symptoms and conduct problems by completing the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). The SDQ was developed for 4–16 year olds and is a brief, 25 item, behavioral screening questionnaire with five scales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior. Only the emotional symptoms and conduct problem scales were examined for this study because these domains were the most relevant targets of the intervention (i.e., hyperactivity/inattention, peer relationship problems, and prosocial behavior were not directly targeted by the intervention). Each of these scales was comprised of five items (e.g., emotional symptoms—"often unhappy, depressed, or tearful"; conduct problems—"often fights with other children or bullies them"). Caregivers rated all items on a 3-point scale: 0 = *not true*, 1 = *somewhat true*, 2 = *certainly true*. In accordance with scoring guidelines for the SDQ, we calculated total scores for each subscale. Subscale scores ranged from 0 to 10 with higher scores reflecting more emotional symptoms and conduct problems. Pre–post-Cronbach's α s for the SDQ were $\alpha = 0.81$ and $\alpha = 0.78$, respectively.

Emotion regulation

Emotion regulation was measured across four key domains: emotion awareness, emotion suppression, emotion-focused coping, and dysregulated expression.

Emotion awareness. Emotion awareness was measured using two items adapted from the eight-item Poor Awareness subscale of the Emotion Expression Scale for Children (EESC; Penza-Clyve & Zeman, 2002), a standard assessment of emotional functioning in children with validated psychometrics in children of 9–12 years (Penza-Clyve & Zeman, 2002). Because the sample of participants in this study was comprised of younger ages (6–11), four items were dropped from the original subscale for ease of data collection and to mitigate participant burden. Two additional items were dropped from the analyses because they were asked in the negative manner and created confusion among our youngest participants. The original 5-point subscale (1 = *not at all true*, 5 = *extremely true*) was modified to a 3-point scale (1 = *not true*, 2 = *sometimes true*, 3 = *very true*) to minimize the complexity of response options for our youngest participants and to parallel the subscales used in other study questions. Items included in the final subscale included: "I am good at figuring out my feelings" and "I usually have words to describe how I'm feeling." In accordance with EESC scoring instructions, we calculated a mean of these two items to obtain an emotion awareness subscale score. Subscale scores ranged from 1 to 3, with higher scores reflecting greater emotion awareness. Pre–postinternal consistency for the emotion awareness subscale was $\alpha = 0.40$ and $\alpha = 0.51$, respectively. Despite relatively low reliabilities, for ease of interpretation and readability and because the magnitude and pattern of results did not differ substantially when

testing these items independently, these items were combined into one composite measure of emotion awareness.

Emotion suppression. Emotion suppression was measured using one item adapted from the four-item inhibition subscale of the children's sadness management scale and the children's anger management scale (CSMS; CAMS; Zeman, Shipman, & Penza-Clyve, 2001). The CSMS and CAMS are parallel, yet separate, inventories that each measures discrete emotions (sadness and anger). For simplicity, the stems of the items from the CSMS were used to inform all questions adapted from this measure. The CSMS and CAMS scales are widely used measures of children's sadness and anger management with a clear factor structures, high internal consistency, convergent validity, and test-retest reliability (Zeman, Shipman, & Penza-Clyve, 2001). Three items from the original emotion regulation subscale were dropped to minimize participant burden. The remaining item, "When I get upset I hold it in," was adapted from the original item (which referenced "sadness and anger") to capture the range of emotions related to distress (i.e., upset) that were targeted by the intervention. The adapted item, rated on a 3-point scale (1 = *not true*, 2 = *sometimes true*, 3 = *very true*), was modified from the original response options for ease of understandability for our younger sample; the original measure indexed frequency of truth: 1 = *hardly*, 2 = *sometimes*, 3 = *often*.

Emotion-focused coping. Emotion-focused coping was measured using two items adapted from the five-item emotion regulation subscale of the CSMS/CAMS (Zeman, Shipman, & Penza-Clyve, 2001). Two items were dropped from the initial assessment to minimize participant burden, and one item was excluded from analyses because this item reduced the α to well below acceptable levels. Items retained for analyses were adapted very slightly from the original items to maximize comprehension among our younger participants. The original items: "I try to calmly deal with what is making me feel sad/angry" and "I can stop myself from losing control over my sad/angry feelings" were modified slightly to "I try to be calm when something is making me feel sad or mad" and "I can stop myself from losing control over my sad or mad feelings." These items were similarly assessed on a 3-point scale (1 = *not true*, 2 = *sometimes true*, 3 = *very true*). In accordance with CSMS/CAMS scoring instructions, we calculated a mean of these two items to obtain an emotion-focused coping subscale score. Subscale scores ranged from 1 to 3, with higher scores reflecting greater emotion-focused coping. Pre-postinternal consistency for this subscale was $\alpha = 0.49$ and $\alpha = 0.64$, respectively.

Dysregulated expression. Dysregulated expression was measured using two items adapted from the three-item dysregulated expression subscale of the CSMS/CAMS (Zeman, Shipman, & Penza-Clyve, 2001). One item was dropped to minimize participant burden. The items "I whine and make a fuss when something makes me feel mad or sad" and "I cry and carry on when I'm sad or mad" were adapted from original

items, which used the word “angry” instead of “mad.” Items were rated on a 3-point scale (1 = *not true*, 2 = *sometimes true*, 3 = *very true*). In accordance with CSMS/CAMS scoring instructions, mean scores on the dysregulated expression subscale were calculated, with higher scores reflecting more dysregulated expression. Pre-postinternal consistency for this subscale was $\alpha = 0.66$ and $\alpha = 0.50$, respectively. Items were combined into one composite despite less than ideal reliability at postassessment because the magnitude and pattern of results did not differ when testing these items independently.

Caregiver and child satisfaction

Both caregivers and children rated their satisfaction with aspects of the program at the end of the last group session. Items on each survey were created in collaboration with The Children’s Treehouse Foundation based on their domains of interest and relevance for implementation.

The caregiver satisfaction survey included 19 items that assessed degree of satisfaction with the staff and overall program, the degree to which caregivers believed that the program had benefited their child, and the degree to which caregivers believed they had experienced personal benefit from the program. A sample item from this survey was “This program helped my child cope better with my illness.” Items were rated on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). Overall caregiver satisfaction was derived by calculating a mean score across all 19 items, with higher scores reflecting greater satisfaction. Internal consistency for the caregiver satisfaction survey was $\alpha = 0.88$. Caregivers also provided qualitative, open-ended responses to three sentence prompts: “The most helpful part of the program was...” “The part of the program my child liked the best was...” and “I think the program should also include...”

Children indicated agreement or disagreement (“Yes” or “No”) on seven items assessing whether they liked the program and found it helpful. A sample item from this survey was “I was glad to be here.” Item scores ranged from 0 (“No”) to 1 (“Yes”). Overall child satisfaction was derived by calculating a mean score across all seven items, with higher scores reflecting greater satisfaction. Internal consistency for the child satisfaction survey was $\alpha = 0.54$. Children also provided a qualitative, open-ended response to one sentence prompt: “The best part of the program was...”

Fidelity and implementation quality

Facilitators completed a Fidelity Checklist at the end of each session and rated the degree to which 38 targeted concepts and skills were covered in the session. Degree of coverage was rated on a 5-point scale (1 = *not at all* to 5 = *thoroughly covered*). The highest rating for each item across sessions within each cohort was retained. An average fidelity score was calculated for each cohort and for each site. Facilitators also recorded session attendance.

Table 2. Demographic characteristics.

	<i>M</i> (<i>SD</i>)	
	<i>N</i>	%
Age in years (<i>n</i> = 45)	9.33 (1.66)	
Age		
6	4	8.9
7	8	17.8
8	7	15.6
9	8	17.8
10	8	17.8
11	10	22.2
Gender		
Female	20	45.5
Male	24	54.5
Ethnicity		
Asian	3	6.8
Black/African-American	2	4.5
Caucasian	31	70.5
Hispanic/Latina/Latino	2	4.5
Multiethnic	6	13.6
Family member with cancer		
Biological mother	26	59.1
Biological father	15	34.1
Other (e.g., stepfather, grandmother)	3	6.8
Behavioral/mental health treatment		
No	26	59.1
Yes	18	40.9

Statistical analysis

Paired sample *t*-tests were conducted to analyze change in each of the primary and secondary outcomes (e.g., psychobehavioral functioning, emotion regulation, and parent and child satisfaction).

Results

Demographics

Table 2 depicts all demographic data. The sample comprised slightly more males (55%) than females and had a mean age of 9.33 (*SD* = 1.66; range = 9–11 years). Participants were predominantly Caucasian (71%) or multiethnic (14%). Most participants had learned of their caregiver's diagnosis immediately after it was made (median = 0 days; mean = 5.78 days). At the time of the preassessment, approximately 41% of participants had received some type of behavioral or mental health treatment from another provider to help cope with the diagnosis.

Primary outcomes

Table 3 presents the means and *SD*s for pre and postoutcome measures, results of paired sample *t*-tests, and Cohen's *d* measures of the effect size.

Table 3. Results for psychobehavioral functioning, emotion regulation, and satisfaction.

	<i>N</i>	Possible range	Premean (SD)	Postmean (SD)	<i>t</i>	Effect sizes
Psychobehavioral—Caregiver report						
Emotional symptoms	42	0–10	3.24 (2.69)	2.57 (2.45)	2.78***	0.87
Conduct problems	42	0–10	1.52 (1.66)	1.24 (1.62)	1.82*	0.57
Emotion regulation—Child report						
Emotion awareness	42	1–3	2.18 (0.55)	2.35 (0.57)	−2.10**	0.66
Emotion suppression	43	1–3	2.02 (0.86)	1.60 (0.70)	2.80***	0.85
Emotion-focused coping	40	1–3	2.38 (0.54)	2.39 (0.50)	−0.14	0.05
Dysregulated expression	42	1–3	1.66 (0.64)	1.75 (0.57)	−1.00	0.31
	<i>N</i>	Possible range	Mean (SD)		Range	
Caregiver satisfaction	43	1–5	4.79 (0.38)		3.67–5.00	
Child satisfaction	43	0–1	0.89 (0.15)		0.57–1.00	

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$.

Psychobehavioral functioning

Emotional symptoms. Caregivers reported significant decreases in emotional symptoms from pre to post ($p < 0.01$), which corresponds to a large effect size (Cohen's $d = 0.87$).

Conduct problems. Caregivers reported marginally significant decreases in conduct problems from pre to post ($p = 0.08$), which corresponds to a medium effect size (Cohen's $d = 0.57$).

Emotion regulation

Emotion awareness. Children reported significantly increased pre to post changes in emotion awareness ($p < 0.05$), which corresponds to a medium effect size (Cohen's $d = 0.66$).

Emotion suppression. Children reported a significant decrease in suppression of emotion from pre to post ($p < 0.01$), which corresponds to a large effect size (Cohen's $d = 0.85$).

Emotion-focused coping. Children reported a nonsignificant increase in emotion-focused coping ($p = 0.89$), which corresponds to a small effect size (Cohen's $d = 0.05$).

Dysregulated expression. Children reported a nonsignificant increase in dysregulated expression ($p = 0.32$), which corresponds to a small effect size (Cohen's $d = 0.31$).

Secondary outcomes

Caregiver satisfaction

Feedback from caregivers reflected very high overall satisfaction ($M = 4.79$; $SD = 0.38$; range = 3.67–5.00). Caregivers were also asked to provide comments regarding aspects of the program they found helpful as well as suggestions for improvement. Overall, caregivers felt that the most beneficial aspects of the program were exposure to other children and families experiencing cancer and the provision of a safe environment to discuss difficult emotions. When asked to provide suggestions for improvement, caregivers expressed a desire for more personalized support or extended content/sessions (e.g., “more input from counselors as to how child is doing,” “maybe one on one talks,” “a feedback session with the parents,” “more sessions,” “it was awesome; it should last longer”).

Child satisfaction

Feedback from children was also very positive ($M = 0.89$, $SD = 0.15$; range = 0.57–1.00). Children’s qualitative responses indicated that they appreciated the art and crafts component of the program, the social support (e.g., “getting to meet kids that fill [sic] the same way”), and the emphasis on discussion of feelings (e.g., “when we talked about feelings—it helped me feel better”).

Attendance

All participants ($N = 45$) attended at least 80% of scheduled sessions. 70% of this sample attended all scheduled sessions.

Fidelity

Overall fidelity scores for each cohort ranged from 3.89 to 5 (only one cohort scored below 4), indicating adequate to thorough coverage of key concepts and topics addressed by the CLIMB[®] curriculum. An average fidelity score was calculated for each site and is presented in [Table 1](#). All sites achieved adequate-high fidelity.

Discussion

This study used a pre–postdesign to examine the effects of the CLIMB[®] intervention, delivered in several cancer center locations, for children (aged 6–11) with a parent or caregiver with cancer. The study examined caregiver reports of children’s psychobehavioral functioning (emotional symptoms and conduct problems), child reports of emotion regulation (emotion awareness, emotion suppression, emotion-focused coping, and dysregulated expression) as well as parent and child reports of satisfaction with the CLIMB[®] program.

Results for psychobehavioral functioning indicated significant decreases in emotional symptoms and marginally significant decreases in conduct problems. Results for emotion regulation were more nuanced. As expected, children’s reports of

emotion awareness and suppression significantly increased and decreased, respectively. Emotion-focused coping also increased, but this change was very minimal. Results for dysregulated expression were in the opposite direction than expected. Although not significant, children reported having less control over negative feelings and associated behavior (i.e., crying and carrying on) from pre to post. Finally, reports of both parent and child reflected high satisfaction (e.g., parents felt strong that CLIMB[®] benefited their child and children.)

These findings did not align completely with our predictions. However, they may not be entirely surprising. For example, results converge with several theories and process models of emotion regulation and emotional intelligence (Gross, 1998; Mayer, Salovey, Caruso, & Sitarenios, 2001; Thompson, Dizén, & Berenbaum, 2009), whereby understanding one's awareness of emotions precedes one's ability to engage in adaptive strategies to modulate the internal experience of emotion, and both of these may precede the final stage, which is behavioral modification (e.g., control over expression of emotions). Thus, results may reflect improvement in skills that characterize the beginning stages of emotion/behavioral regulation mastery and that a longer term follow-up may reveal changes in dysregulated expression.

Still, the question remains why does the direction of results (albeit nonsignificant) reflect increases, rather than decreases, in dysregulated expression? One possible explanation for this is that children's greater understanding of their emotions may be a reflection of an increased awareness of negative emotions, in particular. Indeed, some experimental evidence demonstrates that adaptive emotion regulation strategies that involve promoting emotion awareness can have the short-term effect of increasing individuals' experience of negative emotions (Liverant, Brown, Barlow, & Roemer, 2008). Thus, control over these emotions may only be optimally achieved over time. Again, a longer term follow-up may demonstrate improvements in this outcome.

Importantly, parent reports of reductions in emotional symptoms and conduct problems corroborate the validity of the child reports and provide additional evidence for the efficacy of the CLIMB[®] intervention. Overall, the pattern of child-reported results indicate that CLIMB[®] is a promising intervention to improve emotion awareness and reduce emotional suppression.

Several limitations of the current study merit further investigation. First, the pre-postdesign of this study precludes causal conclusions that the effects were due specifically to the CLIMB[®] intervention. Randomized controlled studies are needed to rule out naturalistic effects of time and to determine the causative effects of CLIMB[®]. Second, as a pilot study, results must be interpreted with caution because the small sample size in this investigation may have restricted our ability to detect significant results. Effect sizes ranged from medium to large for all results except for the unexpected findings for dysregulated expression, which had a small effect size. Thus, overall, the present research lays the groundwork for future investigators to safely invest in adequately powered randomized controlled trials to more definitively test the efficacy and effectiveness of CLIMB[®]. Third, the present study used only two- or

single-item measures for each outcome. Although each item was derived from standardized and well-validated scales, future studies would do well to retain more items from each subscale to ensure assessments with established psychometric properties. Finally, a longer term follow-up beyond an immediate post-training assessment is needed to determine whether CLIMB[®] has lasting effects on psychobehavioral functioning and emotion regulation.

Conclusion

CLIMB[®] is the only group-based, manualized, and internationally delivered intervention that has been developed specifically for children with a parent or caregiver with cancer. However, empirical evidence in support of the effects of CLIMB[®] is extremely limited. This pilot study reports the first quantitative analysis of the effects of CLIMB[®]. Results indicate that CLIMB[®] is a promising intervention for improving psychobehavioral functioning and emotion regulation in children aged 6–11. Future studies are needed that investigate the effects of CLIMB[®] using randomized controlled designs.

Note

1. The intervention allows for flexibility with the number and length of sessions. In the current study, number of sessions per cohort ranged from 4 to 6 (median = 6) and session length ranged from 60 to 120 min (median = 90).

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