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Problem-solving Strategies of Women Undergoing Chemotherapy for Breast Cancer

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Abstract

Background—Many women undergoing chemotherapy for breast cancer experience side effects that make it difficult to perform daily occupations.

Purpose—To summarize the types of challenges, goals, and adaptive strategies identified by women with Stage 1–3 breast cancer participating in a pilot study of Problem-solving Treatment-Occupational Therapy (PST-OT).

Methods—Content analysis of 80 PST-OT sessions.

Findings—Women addressed eleven types of challenging activities, with exercise and independent activities of daily living (IADLs) being the most common. Women most commonly set a goal to adapt a current activity, but also set goals to find a new activity, plan an activity, or gather information about a possible activity change in the future. The adaptive strategies generated by the women were grouped into five types. Most often they found ways to add a new step to an activity, but they also brainstormed when, how, where, and with whom they could do activities.

Implications—The women were usually trying to adapt familiar activities, but also were looking for ways to include new, healthy occupations into their routines.

Keywords

breast neoplasms; problem solving; occupational therapy; recovery of function; exercise; cancer

Despite advances in symptom management, many women undergoing chemotherapy for breast cancer experience side effects such as fatigue, nausea, and neuropathy (Cavaletti, Alberti, Frigeni, Piatti, & Susani, 2011; Hilarius et al., 2011; Skerman, Yates, & Battistutta, 2011). These side effects can make it difficult to perform daily occupations (Seifert, 2010), and adhere to exercise or nutritional guidelines that could help to minimize cancer symptoms and treatment side effects. For example, aerobic exercise has been found to increase cardiorespiratory fitness (Markes, Brockow, & Resch, 2006) and reduce fatigue

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(Cramp & Daniel, 2008) in women undergoing cancer treatment. However, adherence to exercise routines is challenging while undergoing chemotherapy (Pickett et al., 2002; Pinto, Rabin, & Dunsiger, 2009). Making lifestyle changes to promote health and cope with the rigors of chemotherapy treatment requires women to become active participants in their disease management (Schulman-Green et al.), a process known as self-management (Lorig & Holman, 2003).

One self-management skill is the ability to solve problems (Glasgow, Davis, Funnell, & Beck, 2003). Problem-solving treatment (PST) has been used to help people with cancer to generate and evaluate various solutions for challenges they face in life (Nezu, Nezu, Friedman, Faddis, & Houts, 1998). PST was originally developed as a therapy for depression (D'Zurilla & Nezu, 1999) and has been adapted for use in medical settings (Hegel et al., 2002; Unutzer et al., 2002). A key component of PST is patient activation. The PST therapist does not suggest specific solutions, but instead teaches patients to independently use a six-step process (see Table 1). In this way, the patient becomes an active director of his or her recovery.

Research indicates that PST is effective in preventing and reducing depression (Arean, Hegel, Vannoy, Fan, & Unutzer, 2008; Mynors-Wallis, Gath, Day, & Baker, 2000; Mynors-Wallis, Gath, Lloyd-Thomas, & Tomlinson, 1995; Robinson et al., 2008; Rovner & Casten, 2008; Rovner, Casten, Hegel, Leiby, & Tasman, 2007), with smaller effect sizes seen in reducing associated disability (Alexopoulos et al., 2011). While women with breast cancer often struggle with distress and depression (Burgess et al., 2005; Christensen et al., 2009), they also have practical challenges related to activity engagement (Kärki, Simonen, Mälkiä, & Selfe, 2005; Miedema et al., 2008). In a recent randomized controlled trial (RCT), we augmented PST by introducing information from The Person-Environment-Occupation (PEO) Model (Law et al., 1996). We taught women that when they are unable to perform a valued activity, they can: (1) change something about their personal skills, (2) change the environment in which the activity is performed, or (3) change the nature and steps of the activity itself. We called this modification "PST-OT" (Hegel et al., 2010). Our goal was to use the PEO model to enhance the ability to generate varied solutions to activity-related challenges.

The RCT demonstrated that participants were highly satisfied with PST-OT and that it was feasible to implement (Hegel, et al., 2010). Intervention participants had better outcomes in terms of anxiety and quality of life, particularly for the domains of social, functional, and emotional well-being (Hegel, et al., 2010). In order to understand the needs of the participants and how the intervention might be improved and tailored in subsequent trials, we analyzed the content of the PST-OT sessions. The purpose of this paper is to summarize a) the types of challenges that the women chose to focus on during the problem-solving sessions, b) the types of goals they set regarding those challenges, and c) the number and breadth of adaptive strategies they identified during brainstorming.

Methods

Enrollment Procedures

The study procedures were approved by the Committee for the Protection of Human Subjects at Dartmouth College. Recruitment occurred at a National Cancer Institute-designated Comprehensive Cancer Center in the Northeast of the United States of America. Women were eligible for the RCT if they were 18 years of age or older, diagnosed with Stage I, II or III breast cancer, and beginning their second cycle of chemotherapy with doxorubicin or docetaxel/cyclophosphamide every three weeks, or dose dense doxorubicin/cyclophosphamide every two weeks, or doxorubicin/paclitaxel/trastuzumab. Women were

excluded if they had moderate cognitive impairment (according to the six item screener by Callahan, Unverzagt, Hui, Perkins, & Hendrie, 2002), history of schizophrenia or bipolar disorder, or a concurrent cancer diagnosis.

A research assistant (RA) met weekly with the oncology providers to identify eligible women. A nurse presented the study during chemotherapy teaching and the RA followed up with women during their second session of chemotherapy. The RA obtained informed consent then opened an envelope randomizing the participant to the intervention or usual care. Participants in the usual care arm were allowed to access any services offered at the cancer center (e.g., support groups run by social services, physical therapy for upper extremity dysfunction, palliative care for symptom management) and were offered PST-OT upon completion of the outcome assessments (data presented elsewhere in Hegel, Lyons, et al., 2010).

The PST-OT Intervention

The interventionist (first author) was an occupational therapist who was not involved in the participants' clinical care. The occupational therapist completed a standardized, seven-week PST training program involving didactic education, role play, and practice (Hegel, Dietrich, Seville, & Jordan, 2004). Participants completed six individual, weekly PST-OT sessions over the telephone. The intervention was delivered by telephone because we targeted a rural population for whom increasing trips to or time spent at the cancer center was not feasible or desirable. The first session included content regarding the purpose of the study, the philosophy of PST-OT (the importance of using a positive problem orientation, the steps of PST-OT, the PEO model, and basic information about how exercise and energy conservation techniques can be used to combat fatigue), and the challenges being experienced by the participant.

Each session, participants used the six steps of problem-solving to address one challenging activity of their choosing. The occupational therapist and the participant each recorded the challenging activity, goal, solutions, advantages and disadvantages of each solution, chosen solution, and action plan on a worksheet. If the goal was to adapt a specific activity and the woman was having trouble generating solutions, the occupational therapist encouraged her during brainstorming to think of ways to change herself, the environment, or the activity.

At the start of subsequent sessions, the occupational therapist asked the woman to describe the results of the action plan constructed in the previous week. Each week, the occupational therapist asked the woman if, over the past week, she had (1) participated in any aerobic exercise; (2) performed an upper extremity exercise program (if prescribed by oncologist or physical therapist); and (3) performed any stress management activity. Participants were asked about these activities because an aim of the program was to promote engagement in healthy behaviors that are linked to positive outcomes in breast cancer survivors (Andersen et al., 2007; Cramp & Daniel, 2008; Sagen, Karesen, & Risberg, 2009).

Data Analysis

Development of a Coding Scheme

The occupational therapist's worksheets contained information regarding a) the types of challenges that the women chose to focus on during the problem-solving sessions (step one of problem-solving), b) the types of goals they set regarding those challenges (step two), and c) the number and breadth of solutions they identified during brainstorming (step three). The goals of this analysis were to summarize these data in meaningful categories. This is best performed through content analysis (Berelson, 1952). The approach uses a systematic and

reproducible process to code the manifest content of a piece of text, then count the data attached to each code.

The occupational therapist entered the challenges, goals, and solutions identified by the women into a database and exported it into a spreadsheet for the coding process. The occupational therapist read and coded each entry, recording an operational definition of each code as it was created. A research intern (second author) who was previously uninvolved in the study then reviewed the data and attempted to use the coding system. The occupational therapist, research intern, and principal investigator (third author) met on three occasions to discuss the codes and the challenges of applying them to the data. Based upon these discussions, the occupational therapist finalized the operational definitions and coded all the data. The research intern also used the finalized definitions to independently code the data, in order to assess the reliability of the coding scheme. The research intern was blind to the occupational therapist's code choices at all times and did not ask questions or attempt further clarification during the reliability coding.

The coding process identified 11 categories of activities that presented challenges: exercise, instrumental activities of daily living (IADL), work, stress management, nutrition, sleep, leisure, childcare, upper extremity exercise, social activities, and miscellaneous (one woman wanted to find a way to incorporate the problem-solving steps into her daily life and habits). There were four categories of goals, reflecting the overall purpose of what the women were trying to accomplish within a session: adapt an activity, find a new activity, plan the steps of an activity, and gather information about making a future decision. The "adapt" category indicated that a woman was trying to figure out how to do a familiar activity in a new way, perhaps to make it easier, less tiring, more enjoyable, or less stressful. The sessions in which the goal was to adapt offered the opportunity to assess the number and breadth of the adaptive strategies generated by the women. It was in these sessions that the occupational therapist prompted the women to identify ways to change something about themselves, the environment, or the way in which they do an activity. Initially, we attempted to code the adaptive strategies in terms of whether they involved an adaptation of the person, the environment, or the occupation. This coding scheme was hard to operationalize. For example, if a woman was adapting her usual activity of walking outside with a friend by walking inside on the treadmill, she has changed both the environment and the occupation. The final coding scheme for the adaptive strategies had five codes: who, what, where, when, and how.

Inter-rater Reliability

We exported the coded data into SPSS Statistics 19 and used the crosstabs function to calculate the kappa statistic and percent agreement between the occupational therapist's coding and the intern's coding for the activity challenges, goals, and the types of adaptive strategies.

Descriptive Summary

For the activity challenges, we calculated the frequencies of the occupational therapist's categories, first by the proportion of participants whose data included the category and then by the number of sessions. We calculated the average number of activity challenges covered over each participant's sessions. We repeated these analyses for the goal. We then split the file and explored the frequency of the activity challenges according to the goals.

Next, we calculated the frequencies of the various types of adaptive strategies identified by the occupational therapist in sessions where the goal was to "adapt" an activity. We calculated the average number of adaptive strategies generated by the women per session

and the average number of different types of strategies generated per session. For each of the women who had at least one session focused on adapting an activity, we counted how many of the five categories of strategies she used over all of her sessions and identified the mean and standard deviation.

Findings

Participants

Fifteen women (of 31) were randomized to the intervention condition. Two of those participants withdrew from the study prior to completing any sessions. Three women from the control condition chose to participate in the PST-OT program after completing all study requirements. This created a sample of sixteen women who had completed at least one session of PST-OT. Participant demographics are presented in Table 2. The average age was 54 years ($sd = 9$) and the majority of women were college-educated, married or partnered, and working at least part time.

PST-OT sessions

First sessions, on average, lasted 71 minutes ($sd = 16$ minutes) and subsequent sessions lasted 35 minutes ($sd = 13$ minutes). Eleven of the women completed all six PST-OT sessions. Two women completed five PST-OT sessions (during the sixth session they felt their challenges had been resolved and chose not to use the problem-solving process). Two women withdrew from the intervention after completing one session and one woman withdrew after completing two sessions. Thus, the dataset for this analysis consisted of 80 sessions in which the women used the problem-solving process to address an activity challenge.

Activity challenges

There was 90% agreement between raters for the activity challenge categories ($\kappa = 0.88$; $p < 0.001$). The average number of different activities addressed by a participant over all of her sessions was 2.9 ($sd = 1.4$; range 1–5). The challenges are summarized in Table 3. Exercise and instrumental activities of daily living (IADLs) challenges were addressed in 29% and 18% of the sessions, respectively. Similarly, 69% of the women addressed exercise in at least one session and 44% addressed an IADL challenge in at least one session. Approximately one-third of the women worked on challenges related to paid work, getting adequate nutrition, and getting adequate sleep, and one-quarter of the women worked on challenges related to general stress management.

Goals

There was 88% agreement between raters for the types of goals ($\kappa = 0.82$; $p < 0.001$). On average, women tended to set two types of goals over the six sessions (mean = 2.3, $sd = 1$, range = 1–4). Table 4 presents the categories, the number of sessions generating the goals, and the number of women who generated the type of goal in at least one session.

Adapt—In 40% of the sessions, the women used the PST-OT structure to identify ways to adapt their customary activities and routines. In those situations, the women generally knew that they wanted to do a particular activity (e.g., a load of laundry) or a broad class of activities (e.g., housekeeping) that were already part of their daily routines, but were not sure exactly how to make it easier or more effective. Seventy-five percent of the women had at least one session where the focus of the goal was to adapt an activity that they currently do.

The women tried to adapt a broad range of activities. Twenty-two percent of the “adapt” sessions were focused on adapting IADLs and 18% were focused on adapting the foods that were being eaten. Exercise, work, and stress management activities, each accounted for 13% of the sessions focused on adapting activities. Sleep (9%), upper extremity exercise (6%), leisure, (3%) and child care (3%) made up the remainder of the sessions where the goal was to adapt an activity.

Find New—In 31% of the sessions, the women used the PST-OT structure to find new activities they could add to their daily routine that would solve a particular challenge. These sessions most often addressed finding new ways to get exercise (60%) or manage stress (20%). Two or fewer sessions addressed finding new leisure, IADLs, or child care activities, or ways to incorporate the problem-solving structure with friends and family (“miscellaneous”).

Plan—In 19% of the sessions, the women knew exactly what they wanted to do and they used the PST-OT structure to plan out the steps they needed to take to solve their problem. These planning sessions usually focused on IADLs (40%) or work activities (33%). Two or fewer sessions focused on planning out steps involved in aerobic exercise, sleep-promoting activities, or child care.

Gather—In 10% of the sessions, the women were trying to decide how to gather the information they needed to know in order to solve a problem. They were not ready to actually adapt or perform a new activity, but they were interested in getting more information about their options for adapting or finding a new activity. The “gather” sessions usually addressed exercise (38%), with one session focused on each of the following challenging activities: work, nutrition, sleep, leisure, and social activities.

Adaptive strategies

There was 77% agreement between raters for the five types of adaptive strategies ($\kappa = 0.70$; $p < 0.001$). The average number of adaptive strategies identified within each of the 32 sessions where the goal was to adapt an activity was 4.4 (range = 1 to 8, $sd = 1.5$). Table 5 presents the categories, the number of sessions in which the type of strategy was generated, and the number of women who generated the type of strategy in at least one session.

Thirty-two percent of the strategies involved adding an extra step to one’s routine in advance of an activity that would make it easier to perform the activity (“what” category). For example, the women talked about taking a nap before going to the grocery store or taking a medication to reduce hot flashes that interfered with sleeping. Strategies that involved changing the timing (“when” category) or the process of doing an activity (“how” category) each accounted for 21% of the solutions. An example of the former was to exercise after work instead of before, and an example of the latter was to sit down while folding laundry instead of standing. Sixteen percent of the strategies involved engaging the assistance of another person (“who” category), for example, asking a family member to unload groceries from the car. Ten percent of the strategies involved changing the location or an aspect of the physical environment in which an activity was done (“where” category), for example, walking outside for exercise as opposed to walking inside the shopping mall.

Within each session, the women identified an average of 2.7 different types of adaptive strategies to address an activity challenge (range 1–5, $sd = .96$). As reported in Table 4, there were 12 women who had at least one session where the goal was to adapt an activity. On average, those twelve women identified 3.7 different types of adaptive strategies over all of their sessions focused on adapting an activity (range 1–5, $sd = 1.3$). Only one of the 12

identified one type of strategy exclusively and one other woman used only two strategies (those women only had one session each that focused on adapting an activity). The remaining 10 women identified at least 3 different types of strategies across their sessions focused on adapting an activity.

Discussion

The purpose of this study was to summarize the challenges, goals, and adaptive strategies generated in the PST-OT sessions in order to understand how to improve and tailor the PST-OT program for subsequent clinical trials. The women used the program to address a wide variety of activity challenges, with the most common being exercise and IADL. The goal of most sessions was to adapt a particular, familiar activity or set of activities that the women were already doing. This was what we expected to see when we initiated the trial, as the literature had suggested that many women undergoing chemotherapy have trouble performing daily activities due to symptoms and treatment side effects (Seifert, 2010). Almost a third of sessions focused on finding a new activity to add to a woman's daily routine. This was somewhat surprising and encouraging as many women reduce their level of activity during and after chemotherapy (Cusick, Lawler, & Swain, 1987). Almost a fifth of sessions focused on planning exactly how to perform an activity. The women wanted to prioritize where to start and weighed out the advantages and disadvantages of what to do first. Finally, 10% of the sessions' goals were related to gathering more information needed to make a choice. In those situations, the women could be considered to be in the contemplation and preparation stages of action (Prochaska, DiClemente, & Norcross, 1992), where they are considering, but not yet ready to make, a change to their daily routines.

When the goal was to adapt an activity, the women typically identified four or more strategies to address the challenge. Ten out of 12 women identified at least three different types of adaptive strategies over their sessions. One key problem-solving skill is the ability to think flexibly and creatively when brainstorming, so that a person has multiple, varied solutions from which to choose (D'Zurilla & Nezu, 1999). The PEO model was used to prompt women to think innovatively about potential activity modifications. Given the number and range of the adaptive strategies, the PEO model appears to have been effective in helping women to consider a range of adaptive strategies when brainstorming.

Limitations

The results of this analysis should be considered exploratory, as it is uncertain how well they generalize to other women undergoing chemotherapy. For example, while this analysis suggests that exercise was an important activity for participants, the high frequency may partly reflect the fact that the occupational therapist asked participants each week whether they were exercising. Knowing that they would be asked and encouraged to exercise (as a way to reduce fatigue, minimize chemotherapy side effects, and maintain physical conditioning) could have led women to address the topic of exercise frequently during the PST-OT sessions.

Having the occupational therapist develop the coding scheme is both a strength and limitation of this analysis. The occupational therapist participated in the sessions and has experiential insight into what the women were discussing and trying to accomplish within the program. However, the occupational therapist is also invested in the process and the outcome of improving adaptive brainstorming. To minimize the effects of this bias, we assessed the inter-rater reliability of the coding scheme with an intern not trained in occupational therapy or PST. The substantial agreement between occupational therapist and intern suggests the coding scheme reliably reflects the content of the sessions and supports the further development of this approach.

Future Research

In future trials of PST-OT, it may be helpful to prompt women to consider the PEO components during other stages of problem-solving instead of only during brainstorming how to adapt an activity. For example, prompting women to consider personal preferences, environmental features, and activity characteristics when considering the advantages and disadvantages of various solutions might enhance the process. If future studies confirm that PST-OT has a positive effect on quality of life, mood and ability to function, the intervention could be applied with other populations of people with cancer.

Conclusion

For occupational therapy practice in oncology, these data suggest that women undergoing chemotherapy are interested in setting goals and making changes across a variety of areas in their lives. Almost as many women were interested in adding a new activity to their daily routines as were interested in adapting current activities. Occupational therapy practitioners can play a role in helping women build the problem-solving and broader self-management skills to facilitate lifestyle adjustments during chemotherapy.

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Key Messages

- The women worked on a wide range of activity challenges, including exercise (aerobic and upper extremity), IADL, work, stress management, nutrition, sleep, leisure, and child care.
- The women were most often trying to adapt familiar daily activities, but also were looking for ways to include new, healthy occupations into their daily routines.
- PST-OT is a feasible intervention for promoting creative brainstorming and occupational engagement across a wide variety of life domains.

Table 1

The Six Steps of Problem-solving

1	Identify what makes the activity difficult (i.e., describe the challenges involved in performing an activity in a specific and objective manner).
2	Set a goal that is behavioral, observable, achievable, and general.
3	Brainstorm multiple solutions that could help meet the goal.
4	Identify the advantages and disadvantages (i.e., pros and cons) of each solution and choose a solution
5	Create and implement an action plan that addresses when and how the solution will be implemented, including what resources might be needed, and a "plan B" to address foreseeable barriers to executing the solution.
6	Assess how well the problem was solved by the action plan.

Table 2

Characteristics of Sample (N = 16)

	Mean (<i>sd</i>)	<i>n</i> (%)
Age in years (<i>sd</i>)	54.3 (9.4)	
Race and ethnicity		
White & Non-Hispanic		16 (100)
Marital Status		
Married or living with partner		12 (75)
Divorced		4 (25)
Education		
High school graduate or less		2 (12)
Some college		6 (38)
Bachelor's degree		3 (19)
Graduate degree		5 (31)
Employment		
Full time		8 (50)
Part time		2 (13)
Retired		2 (12)
Not working due to illness or disability		4 (25)
Income		
\$40,00 per year		11 (69)
< \$40,000 per year		5 (31)

Table 3

Challenging Activities Addressed During Sessions

Code	Abridged Definition	Sessions addressing the activity (N = 80) n (%)	Participants addressing the activity (N = 16) n (%) ^I
Exercise	Aerobic exercise done to increase overall strength or endurance	24 (29)	11 (69)
IADL	Activities to take care of one's self, home, and to function in the community	14 (18)	7 (44)
Work	Activities related to employment	10 (13)	5 (31)
Stress	The ability to stay calm, avoid anxiety, and "enjoy the moment"	9 (11)	4 (25)
Nutrition	The ability to eat and maintain adequate nutrition	7 (9)	5 (31)
Sleep	The ability to get adequate sleep (i.e., fall and stay asleep)	5 (6)	5 (31)
Leisure	Activities done for enjoyment or fun	4 (5)	3 (19)
Child	Activities done to take care of or maintain relationships with children	3 (4)	2 (13)
UE	Exercises/activities done to decrease lymphedema and/or to increase strength and/or range of motion of an arm affected by cancer treatment	2 (3)	1 (6)
Social	Activities done for the primary purpose of interacting and connecting with other people (excluding children)	1 (1)	1 (6)
Miscellaneous	Does not fit into any code	1 (1)	1 (6)

^I Percentages do not total 100 because most women addressed multiple activities over the six sessions.

Table 4

Type of Goals Set in Problem-solving Sessions

Code	Abridged Definition	Sessions with the type of goal (<i>N</i> = 80) <i>n</i> (%)	Participants with the type of goal (<i>N</i> = 16) <i>n</i> (%)
Adapt	Wants to adapt a particular activity (e.g., find ways to make it easier, more enjoyable, less tiring, or more effective).	32 (40)	12 (75)
Find New	Wants to find multiple, mutually exclusive new activities that could solve a general problem (e.g., knows she needs to do something to have more fun or get more exercise but does not know what to do)	25 (31)	11 (69)
Plan	Figure out what to do first or what the possible steps of a task are (e.g., prioritize a to-do list)	15 (19)	9 (56)
Gather	Gather information about resources or options	8 (10)	4 (25)

Table 5

Type of Adaptive Strategy Identified While Brainstorming in the 32 Sessions Where the Goal was to Adapt an Activity

Code	Abridged Definition	Number of strategies (N = 142) n (%)
Who	Involving another person.	23 (16)
Where	Changing the location of an activity or an aspect of the environment.	14 (10)
When	Changing the timing or sequencing of an activity	30 (21)
What	Doing or not doing some extra, new step or behavior before or after the actual activity	45 (32)
How	Changing the actual process by which a specific activity is done	30 (21)