



PAPER

Physical activity and exercise self-regulation in cancer survivors: A qualitative study

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Abstract

Objective: Despite the benefits of physical activity, many cancer survivors do not adhere to clinically recommended levels. This qualitative study investigated factors of self-regulation contributing to survivor physical activity patterns.

Methods: Participants attended focus groups with prompts on exercise habits and self-regulation on the basis of social cognitive theory, self-determination theory, and self-regulation theory. Content analysis with a priori codes was conducted to identify emergent themes.

Results: Participants ($n = 35$) were predominately older ($63.7 \text{ y} \pm 10.8$), female (69%), white (71%), and breast cancer (60%) survivors, with 41% not meeting activity guidelines. Emergent themes included exercise goal development, selection, and attainment; exercise planning; and self-reward. Participants tended to develop values-based, general goals rather than action-based, measurable goals. Goal attainment success emerged as a facilitator of future goal performance; completing a current goal facilitated subsequent goal attainment, while failure hindered future goal completion. Rather than having deliberate intentions to schedule exercise, participants exercised if expedient in the context of normal daily activities. Food consumption emerged as a major mechanism for self-reward.

Conclusions: Our findings suggest that values-based goals, unplanned activity, influence from previous goal attempts, and self-reward were important factors related to self-regulation. Interventions designed to improve self-regulation may consider facilitating development of autonomous, value-based goals, assisting in development of strategies for future goals if current goals are not met, endorsing exercise as a scheduled activity, and introducing healthy self-reward alternatives.

KEYWORDS

behaviors, cancer, exercise, oncology, survivors

1 | BACKGROUND

Advancements in detection and treatment of cancer are leading to a steadily growing cancer survivor population. As of 2016, there were an estimated 15.5 million survivors in the United States, a number expected to increase¹ to 26.1 million by 2040. Survivors are living longer with improved quality of life, but persistent threat of recurrence and associated comorbidities remain. As such, public health initiatives

have focused on lifestyle interventions to increase health-promoting behaviors, including total physical activity (PA) and exercise (planned, intentional activity).

Current literature linking PA to overall health is robust, with well-documented benefits to physical and mental/psychosocial health.²⁻⁴ Physical activity has been associated with reduced recurrence rates of some cancers and improved cardiovascular health; this is particularly important as cardiovascular and recurrence-related

issues represent the leading causes of mortality among survivors.^{5,6} Physical activity additionally has beneficial effects for quality of life specific to survivors, such as reducing posttreatment fatigue.⁷ Despite benefits, survivor adherence to recommended levels of activity remains low. Only an estimated 30% to 47% of survivors meet American Cancer Society PA guidelines.⁸

In developing interventions helping survivors increase activity, it is critical to understand the mental states and cognitive processes involved in behavior change. Self-regulation theory outlines cognitive processes involved in behavior, theorizing that mental representations of potential future behavior manifest as overt goals.⁹ Goal selection, goal setting, goal maintenance, and goal evaluation act as central components of self-regulation that repeat iteratively, while self-monitoring, self-reflection, self-rewarding, and social support represent related influential factors.⁷ Closely tied to self-regulation are the social cognitive theory (SCT) constructs self-efficacy and outcome expectations, and the concept of motivation outlined by self-determination theory (SDT).¹⁰ Self-determination theory postulates that meeting goals and changing behavior are more likely if motivation is autonomous.⁸ Social cognitive theory constructs are related in that meeting incremental goals builds self-efficacy and mastery, while positive outcome expectations for the behavior facilitate goal attainment.¹¹

There is growing evidence that self-regulation is a predictor of engagement with exercise. Studies show that frequent regulatory behaviors (e.g. daily monitoring) result in positive outcomes.^{12,13} Additionally, there is now greater understanding on neurological mechanisms of cognitive control of behavior; Buckley et al demonstrated that cognitive training to increase self-regulation resulted in greater sustained PA.¹⁴

While self-regulation is important for behavior change, adherence to interventions seeking to improve regulation and other psychosocial factors can be low, and fully engaging with PA/exercise interventions can be challenging for survivors.^{15,16} Evidence indicates that the strongest predictors for intervention adherence and engagement are generally pre-levels of psychosocial factors (including self-regulation), as well as previous exercise behavior; those with low self-regulation encounter greater difficulties.^{15,17} However, there is limited research investigating how survivors specifically self-regulate exercise; more knowledge is needed to understand the processes through which survivors develop and set goals, and what allows some to be more successful than others.¹⁸ The purpose of this study is to therefore gain insight into exercise regulation, focusing on elucidating how survivors select, develop, and react to goal attainment.

2 | METHODS

2.1 | Participants

Participants (N = 35) were recruited for a study investigating exercise initiation and maintenance in cancer survivors. Eligibility criteria included being a survivor of stages I, II, or III breast, colorectal, prostate, or endometrial cancer, >18 years of age and having completed primary treatment.

Patients meeting criteria were recruited by telephone through the University of Texas MD Anderson Cancer Center (UTMDACC) patient

database. Additionally, participants were recruited at the UTMDACC Cancer Survivorship Conference, a large event drawing survivors from outside UTMDACC's patient population. Study information was posted on bulletin boards at UTMDACC clinics.

2.2 | Data collection and analysis

Upon providing written informed consent, participants attended 1 of 5 focus group sessions (lasting 105 min) and completed a demographic and behavioral questionnaire. Physical activity was assessed using the short-form International Physical Activity Questionnaire (IPAQ).¹⁹ A senior research coordinator experienced in qualitative methods led focus groups with the aid of an interview guide (developed using SCT, SDT, and self-regulation theory) featuring 15 open-ended questions about exercise habits (eg, "How do you feel about your current exercise habits?") and regulation (eg, "How do you react when you do or don't reach your goals?"). These questions were used to facilitate conversation, but the trained moderator actively attempted to limit assumptions and encourage candid responses. Participants were compensated with a \$20 grocery gift card. Focus groups were conducted until saturation.²⁰ The study was approved by the UTMDACC IRB (#2013-0501).

Focus group recordings were transcribed by a professional coding company and checked for accuracy. The initial qualitative approach was not inductive, and coding was performed by ET and MCR using codes determined a priori. This coding round was performed using constructs from the 3 health behavior theories on which the interview guide was based. This a priori code list included (1) self-regulation, (2) self-efficacy, (3) motivation, (4) outcome expectations, and (5) knowledge. Content analysis was then conducted on sections involving determinants of behavior relating to the self-regulation code; important quotes were identified and organized into clusters of related concepts to create emergent theme groups. Following initial separate readings, a second reading was performed with all authors resolving coding differences through consensus. Qualitative analysis was conducted using ATLAS.ti, version 7.

3 | RESULTS

Participants were older (M = 63.7 y ± 10.8), well-educated (63% ≥ bachelors degree), female (69%), white (71%), and breast cancer survivors (60%). Approximately 41% did not meet ACS PA guidelines, and average time since diagnosis was 148 months (±6.7). Full participant characteristics are presented in Table 1.

3.1 | Exercise goal selection

Participants tended to set goals that were broad and general rather than focused on specific actions or activities. Reflecting the preference of general goals, one participant remarked,

I'm just trying to increase my activity level. That takes me a long way toward getting back in the routine rather than specific workouts. [M,68]

If PA was brought up, it was in the context of day-to-day activities involving incidental PA more than dedicated exercise. As an example of this, one participant said,

TABLE 1 Participant characteristics

Characteristic	N (%)
Race	
Black	5 (14.29)
Asian	4 (11.43)
White	25 (71.43)
Other	1 (2.86)
Education	
<High school	1 (2.86)
Some college/2-y degree	12 (34.28)
Bachelors	7 (20.00)
Masters	12 (34.29)
Further advanced degree	3 (8.57)
Cancer type	
Breast	21 (60.00)
Colorectal	4 (11.43)
Endometrial	3 (8.57)
Prostate	9 (25.71)
Other	1 (2.86)
Gender	
Male	11 (31.43)
Female	24 (68.57)
Current employment status	
Full-time	11 (31.43)
Part-time	1 (2.86)
Not employed, not seeking employment	5 (14.29)
Not employed, but seeking employment	3 (8.57)
Retired	18 (51.43)
Homemaker	4 (11.43)
Student	1 (2.86)
Physical activity (IPAQ)	
High	5 (14.71)
Moderate	15 (44.12)
Low	14 (41.81)

Abbreviation: IPAQ, International Physical Activity Questionnaire.

For me right now, my goal is very general: ... increase the time that I spend walking my dog. [F,58]

Another said,

[For exercise] my goals are pretty simple. I'm an outdoor person when I can be outdoors. And it's all around the weather. This time of year, I'm outdoors every minute if I can be outdoors. And when it gets to summer, not so much. So my exercise routine revolves around what the weather's like outside. [M,61]

Survivors tended to develop values-based goals capturing the reason behavior change was desired as it related to personal values, or other factors important in the person's life. Examples included setting a goal to exercise to serve as a family role model, or staying active to build energy to spend time with family. One participant said,

Well I have grandchildren so my goal is to be able to see them at least graduate from college and married, if I

could, and first dance with my grandson. That would be my goal. But be healthy to at least to do that. [F,65]

Overall, goal setting was viewed as an introspective process where goals were formed from personal sources of motivation and freely chosen based on what the consequences of behavioral change would have to their lives. Reflecting the importance of autonomy and free choice, one participant remarked,

I don't want somebody telling me what to do. I don't want somebody telling me my goals. I don't want a [physical activity fitness] app telling me. [F,58]

Both exercisers and nonexercisers set value-based goals, although exercisers also set specific implementation goals to achieve broader value-based goals. These implementation goals still largely revolved around general activity rather than specific exercise bouts.

3.2 | Action planning

Participants tended to not set formal schedules for exercise. Instead, most who had intentions viewed activity as part of a plan to be completed only if convenient within the course of normal, daily activities. Exercise or activity time, for example, revolved around gardening or pet needs. As one participant said,

[For physical activity] as far as working in the yard, which I do, and being outside, no. You don't plan that particularly. It just comes with the seasons. [F,83]

Changes in schedules of participants disrupting these types of activities meant that activity did not occur. Contingency/backup plans for rescheduling missed activity opportunities were not generally made.

Survivors tended to not treat exercise like an appointment as something to be written on a calendar/planner. Formally scheduling exercise was generally perceived as unappealing. For participants, exercise was something that should not necessitate formal planning; it should be enjoyable and occur within the frame of already-existing activities. This was reflected in one participant's comment:

I don't plan [exercise activities], I don't plan that particularly, certain things have to be done at certain times ... the last thing I'd want is to feel regimented. [F,83]

Another participant echoed,

It's because we can. I don't think we really mean to be so complacent about exercise. But it's that we have this freedom and we want to exercise it, meaning we want to take full advantage. I don't have to listen to anyone else. I'm my own boss. I set my own hours. [F,58]

While a majority of participants in the sample were retired, an employed subset did tend to schedule more. This was attributed to limited time during a workday they could fit in activity. Conversely, retired participants without workdays preferred less structure and more freedom, despite potentially having more time to plan with.

3.3 | Feedback and self-monitoring

Successful performance of past goals emerged as indicators for how successful survivors would be in meeting future goals. Attainment of goals was therefore not independent; goal attainment influenced the success of subsequent exercise goals. Among participants, success in previous goals emerged as an important facilitator and motivator for future goals, with the positive affect after meeting a goal acting as a motivator to drive future performance. Reflecting this, participants said,

There is nothing like success to breed more success. [F,67]

and

For me, success breeds success, which makes me stay with it more. The opposite is true. Which is you've got to get back on that treadmill. For me it's more just a guilt of you didn't make the good choices. I didn't manage my time well enough to fit in those times. So it's sort of just a failure. [F,59]

Failure on previous goals became a barrier for future goals. In this case, negative feelings and discouragement resulted in an additional obstacle to meet future exercise goals. As one participant said,

It's hard to start over again or continue [if I don't reach my goal]. Because if you have really tried and the goal has not been reached, then you're like, well, what was I doing all this for? [F,59]

This type of reaction towards failure/success was most common among nonexercisers attempting to initiate behavior change. Among exercisers, there was less of an affective response to missing a particular goal but also not a greater likelihood to create makeup plans covering for missed exercise.

3.4 | Self-reward

Self-monitoring of goal performance is a central component of self-regulation, including responding to performance feedback through self-rewards or punishments. Self-punishment did not emerge as a consequence of goal failure. One participant remarked,

I don't really like the use of punishment ... I really dig in my heels if I feel like I'm being lectured to or punished. So it doesn't work for me. [M,61]

The reverse was true for self-reward. Participants frequently used self-reward as validation for being active. For example, one participant said,

I have rewards all the time in my life. Are you kidding? ... Food. [F,58]

Self-reward through food consumption, including eating sugary/sweet foods emerged as a primary validation source. As one participant said,

[I reward myself] with eating a chocolate bar, a chocolate cake, and then I feel good. I don't feel guilty. [F,65]

There was also the perception that food rewards would be allowable because exercise counterbalanced unhealthy foods. Reflecting this, one participant remarked,

I have rewards ... [for meeting goals] Food rewards. I mean, when I truly exercise, I could eat whatever I wanted. [F,57]

Both exercisers and nonexercisers self-rewarded through food. Exercisers planned rewards for meeting goals (eg, a small piece of chocolate), while nonexercisers self-rewarded on a larger scale based on affective reactions (eg, feeling good about activity and self-rewarding with a restaurant dinner).

4 | DISCUSSION

Understanding exercise self-regulation among survivors is an important step for intervention development, and this study provides insight into these processes. We found that survivors develop and structure goals differently from how they are often conceptualized in a research setting (broad and value-centered rather than on a specific, measureable activity). Additionally, survivors valued free choice and autonomy in developing goals rather than having goals prescribed. An optimal intervention approach may thus involve helping survivors autonomously develop broader values-based goals to establish a core reason for behavior change, followed by more specific implementation goals to achieve that change. This combines the importance of autonomy in building motivation specified in SDT with evidence that achievable initial goals building incrementally are more likely to be successfully fulfilled over time.^{8,21} Results suggest acceptance commitment therapy may be a promising intervention strategy. Acceptance commitment therapy (a cognitive therapy technique) addresses several of the emergent themes, including promoting and identifying values as foundations for behavior change, and developing psychological flexibility in regulating affect resulting from goal attainment.²² Early evidence indicates that acceptance commitment therapy may increase enjoyment of exercise, improve exercise affect, and reduce perceived effort.^{22,23}

Preference for unstructured activity emerged over planned bouts of exercise. Interventions could thus focus on developing exercise activities more conveniently integrated into survivors' lives, rather than separate supervised sessions. Alternatively, interventions may attempt to change attitudes towards scheduling exercise by highlighting benefits of treating exercise as a structured activity. Evidence has linked higher efficacy for scheduling activity to increased exercise, and scheduling has been identified as a significant intervention component in a recent review of community-based PA/diet interventions.²⁴⁻²⁶

Performance on past goals emerged as a facilitator or barrier to subsequent goals; successful goal attainment paved the way for future goals, while failing to meet current goals made achieving future goals more difficult. This follows the conceptualization of self-efficacy in SCT, where incremental successes act as a growing foundation to overall strengthening of self-perception of ability.²⁷ Interventionists may consider incorporating strategies to help overcome discouraging effects of failing to meet past goals, followed by incrementally building on an initial, achievable goal to strengthen self-efficacy for more challenging goals.

Finally, intervention developers may consider strategies changing food as self-reward to healthier alternatives (eg, tailored food preparation instruction for healthier options). Another strategy might be to cultivate intrinsic motivation eliminating externalized forms of validation such as food rewards. Research indicates that intrinsic motivation is significantly associated with greater long-term exercise adherence.²⁸ Werle et al additionally demonstrated individuals engaging in intrinsically motivated exercise tended to engage in less post-activity eating than individuals perceiving exercise as less naturally enjoyable.²⁹

4.1 | Study limitations

Study results should be considered with several limitations, including generalizability and interparticipant influence within focus groups. Participants were drawn primarily from a database of survivors participating in a larger study; therefore, respondents may have been inherently more motivated and interested in exercise. Characteristics of the sample (primarily female breast cancer survivors) may also limit generalizability. As to intergroup influence, focus group composition was heterogeneous with regard to exercise level. Exercisers may have exerted a more vocal influence in the focus groups because of their success with this behavior.

4.2 | Clinical implications

Understanding self-regulation for lifestyle behaviors in survivors is important for providers involved in long-term posttreatment survivorship care. The Institute of Medicine recommends patients be provided a personalized survivorship care plan (SCP), which can act as a healthy lifestyle guide.³⁰ Evidence exists suggesting patients with SCPs may potentially have better outcomes in some areas, and developing a successful SCP may involve first understanding how survivors feel about and engage with health promoting behaviors such as exercise.^{31,32} Understanding how survivors self-regulate may thus allow providers to work more collaboratively with their patients in developing patient-centered plans with goals that are more realistic and achievable.

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DISCLOSURES

None.

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