Peer mentors delivering a physical activity intervention for cancer survivors: effects among mentors

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Abstract

To further inform implementation efforts of a telephone-based physical activity (PA) intervention for breast cancer survivors, we assessed the PA, fatigue, mood, and quality of life of the peer mentors/coaches who delivered the program. The coaches were volunteers with the American Cancer Society's Reach to Recovery program. The coaches ($n = 18$) delivered the PA intervention to 76 breast cancer survivors in a randomized controlled trial. Coaches completed assessments of PA (self-report), motivational readiness for PA, and standardized measures of psychosocial variables at the start of coaching and at study exit. At study exit, they also responded to an open-ended question on the benefits that they accrued from the study. We used generalized linear models to analyze the PA data and psychosocial variables. Chi-squared analyses were used for motivational readiness. The written responses to the open-ended question were analyzed to identify themes. Coaches' PA exceeded national recommendations at study entry and exit with no significant changes over time. Sixty-one percent were in the maintenance stage of motivational readiness, and 61% remained in the same stage at study exit. Psychosocial functioning also remained stable over time. Qualitative data revealed that the coaches' gains included helping themselves (with four subthemes) and helping others. Intervention delivery had no unintended negative consequences (PA, motivational readiness, and psychosocial functioning) among coaches. They reported gains that were not reflected in standardized psychosocial assessments. These data support further implementation of peer-delivered PA programs to enhance the reach of interventions.

Keywords

Physical activity interventions, Breast cancer survivors, Peer mentors, Coaches

INTRODUCTION

Moderate-to-vigorous physical activity (MPVA) adoption among cancer survivors can improve physical functioning, reduce fatigue, and improve overall quality of life and recovery [1, 2]. Recent studies have highlighted these positive effects of MPVA interventions which have led to national exercise recommendations for survivors [3–5]. As a result, there is growing interest in promoting MPVA among cancer survivors. However, a majority of research studies have

This paper has not been previously published, and the manuscript has not been simultaneously submitted elsewhere.

A portion of these data were presented at the Annual Meeting of the Society of Behavioral Medicine (2015). Table 1 (Descriptive data on coaches) was previously published as Supplementary Material, in Pinto, Stein, and Dunsiger, *Health Psychology*, 2015;34(5):463–472

The authors have full control of all primary data and agree to allow the journal to review the data if requested.

Implications

Practice: Delivering a physical activity intervention had no adverse effect on peer mentors/coaches and they benefitted in specific ways.

Policy: Policymakers who want to promote physical activity among cancer survivors should consider peer mentors in cancer care organizations as potential delivery agents.

Research: Future research should aim at exploring the specific ways in which peer mentors/coaches benefit from promoting physical activity among cancer survivors.

used trained research staff to deliver the MVPA intervention [1].

Volunteerism is a growing trend throughout the USA. In 2015, over 24.9% of the population volunteered for a range of organizations [6]. For example, the American Cancer Society (ACS) has over 2 million volunteers who are commonly involved in providing social support for cancer patients [7]. Studies have suggested that peer support decreases patients' sense of isolation, increases knowledge about the cancer experience, and provides a sense of hope [8, 9]. There are several advantages of using peers as coaches: for example, participants may be more receptive to advice or assistance provided by someone "like" them (e.g., age, disease, marital status). Second, peer programs have the potential to reach patients who may otherwise not seek help from healthcare systems in managing their cancer recovery [10, 11].

As such, peer mentoring programs have been used to maximize impact, sustain, and scale up successful interventions while facing limited resources [11–13]. An added benefit for the organization is that involving peers as the delivery agents can provide opportunities for their greater participation and engagement in community efforts.

Interestingly, there has been limited research on the impact of intervention delivery on the peer mentors/coaches. A qualitative study examined the costs and challenges for peer mentors participating in a telephone-delivered one-to-one peer support intervention for gynecological cancer [14]. The peer mentors reported significant personal benefits from providing support, which included enhanced self-esteem and well-being and gaining a new perspective or closure on their cancer experience. The impact of peer-led lifestyle interventions (such as those promoting MVPA) on the peer mentors has been under-researched. Among the few studies in which peer mentors delivered an MVPA intervention to non-cancer populations, Castro and colleagues (2011) found that their peer mentors/coaches ($n = 12$) did not significantly increase their MVPA over the course of the study (note: coaches reported a mean of 489.4 min/week of MVPA at baseline) [15]. To our knowledge, there has been no exploration of the effects of peer-delivered MPVA interventions on the peer mentors/coaches who are also cancer survivors.

Previously, we had conducted a pilot study [16] in which we partnered with peer mentors of the Reach to Recovery (RTR) program at the ACS and trained them to deliver an empirically supported MVPA program for cancer survivors [17]. The RTR program has been in existence since 1960 and is offered in all 50 US states. It is a breast cancer survivor program that matches trained volunteer breast cancer survivors to women living with breast cancer. Through face-to-face and telephone visits, the volunteers provide understanding and hope to others who need support during their breast cancer experience. To deliver the RTR program, volunteers must have had a diagnosis of breast cancer, be at least 1 year post-treatment, excluding hormonal therapy, report being well-adjusted to their own breast cancer experience, and be willing and able to provide support to others in need. Extensive training, which includes education about ACS programs and services, as well as skills building in the areas of active listening, communication, and health education and providing empathy and emotional support, must be completed before volunteers are allowed to interact with participants. Volunteers also attend annual training and continuing education sessions to maintain skills and learn new information about the program.

After the promising results of our pilot study in collaboration with RTR, we conducted a randomized study in which 18 RTR coaches delivered the same 12-week telephone-based MVPA intervention to 76 breast cancer survivors. The survivors who received the intervention significantly increased their MVPA at

3 and 6 months compared to a contact control condition also led by the RTR peer mentors/coaches [18]. The goals of the current paper were to examine the effects of intervention delivery on the MVPA and psychosocial well-being of the coaches who delivered the intervention. The rationale was that (a) the coaches were not paid for intervention delivery and the potential for dissemination may change if the coaches do benefit in non-monetary terms, (b) data on the potential effects among coaches would be informative to the ACS and may affect their willingness to continue collaborative work, and (c) anecdotal data from the coaches in the pilot study [16] suggested that they did benefit from delivering the MVPA intervention. We examined self-reported MVPA, mood, fatigue, quality of life, and health status using standardized measures among the peer mentors/coaches who delivered the interventions at the start of their assistance in the study and, again, at study exit. Based on our anecdotal data, our hypotheses were that the coaches would increase MVPA and improve their psychosocial well-being (reduce fatigue and improve mood, quality of life, and health status) during their role as coaches.

METHOD

Study design. We conducted a randomized controlled trial wherein 18 RTR coaches delivered either a 12-week exercise intervention (PA Plus RTR) or a contact control condition (RTR Control) to 76 breast cancer survivors. Coaches provided data at study entry, at the end of training, and at study exit. The study received approval from the Institutional Review Boards at The Miriam Hospital (RI) and Women & Infants Hospital (RI).

Recruitment and training of ACS RTR volunteers as study coaches

We recruited RTR volunteers (who had completed RTR training and had been a volunteer for at least a year) to serve as peer mentors/coaches from ACS offices in six New England states. Additional eligibility criteria included willingness to (a) participate in group training, (b) provide coaching to four to five participants, (c) be supervised by telephone, and (d) audiotape telephone contacts with study participants. ACS staff in four states approached 335 RTR volunteers through email, informational mailings, and personal contact and provided them a recruitment brochure. Thirty-one volunteers expressed interest in the study: two were lost to follow-up prior to telephone screen, and one was not available for training. Of the 28 who were screened for eligibility, 6 did not begin training (reasons: not available for training sessions [$n = 1$], taking care of a family member/illness [$n = 2$], time constraints [$n = 1$], not interested [$n = 1$], lost to follow-up [$n = 1$] and 4 did not complete training (reasons: family emergency

$n = 1$], time constraints [$n = 1$], not interested [$n = 1$], and did not like the questionnaires [1]). Eighteen completed the four-session training (64% of those screened). [18].

Coaches were trained in small groups either in person or via video conference. The training program (4 sessions, 2 h per session) focused on the research goals, intervention theory, intervention components, and human subjects' certification. Didactics and role plays with trainer feedback were used to train PA counseling skills. All coaches were trained to deliver the PA counseling as well as the RTR Control condition. Coaches also received training on monitoring participant safety during exercise and notification of research staff in case participants experienced physical symptoms such as chest pain or psychological distress so that the researchers could follow up to ensure participant safety [18]. At the end of training, all coaches completed a knowledge test about PA and PA counseling to ensure they had an understanding of key issues.

Participants in the randomized controlled trial

Seventy-six participants were enrolled in the trial following informational mailings to breast cancer constituents on mailing lists maintained by the ACS, hospitals and private practices, recruitment at health fairs, and other venues (see details in [18]). Participants were women aged ≥ 21 years with stage 0–3 breast cancer (diagnosed in the past 5 years) who had completed surgery (patients receiving on-going chemotherapy, radiation, or hormone treatment were eligible), were able to read and speak English, were able to walk half-mile without stopping, were sedentary, and were willing to receive telephone calls [18].

Intervention delivery

Following baseline assessments, the Intervention Coordinator assigned participants to coach based on scheduling availability and similarity of cancer treatment(s). Each coach was asked to call her assigned participant(s) in PA Plus RTR or RTR Control once a week over 12 weeks and audiotape the calls. Research staff provided bi-weekly individual supervision and guidance by phone during intervention delivery [18]. Supervision was focused on ensuring that both the content of calls was delivered per protocol as well as helping the coach deal with specific roadblocks of the individual participants and providing feedback on process elements (e.g., ask open-ended questions, use reflective statements, etc.).

Pa Plus RTR group

Coaches delivered the telephone-based PA intervention that had been previously tested [17] to this group. The goal was to encourage participants to gradually increase the amount of aerobic PA (e.g., brisk walking) over 12 weeks to recommendations of ≥ 30 mins of moderate-intensity PA on most

days of the week [19]. During the calls, the coaches assessed PA and motivational readiness, identified any health concerns related to PA, helped the participant to identify and problem-solve barriers to PA, and helped them to set PA goals for the following week. They reinforced participants for monitoring PA and for efforts to become physically active. All participants received a pedometer (Digiwalker), a heart rate monitor, and logs to monitor PA, RTR print materials, PA feedback reports, and 12 PA tipsheets. Coaches reviewed the logs during the telephone calls; the logs were then sent to the research staff for data entry. Coaches addressed questions and concerns participants may have had about breast cancer and its treatment [18].

RTR Control group

Coaches called these participants once per week for 12 weeks and responded to participants' questions about breast cancer and administered the Weekly Symptom Questionnaire [20]. They were asked not to join a structured PA program during the 12-week intervention phase. Participants were provided RTR print materials [18].

Measures completed by coaches

At study entry, coaches provided informed consent and provided demographic information (e.g., age, education), their breast cancer history (e.g., time since diagnosis), and the duration of their RTR experience. At study entry and at study exit, they completed an interview assessing their MVPA, motivational readiness, and questionnaires assessing psychosocial variables such as fatigue and quality of life. At study entry, at the end of their training, and at study exit, they completed a questionnaire assessing their confidence in intervention delivery. At study exit, they completed a study evaluation. The measures are described below:

1. *Seven-Day Physical Activity Recall* (7-day PAR) [21], a widely used, validated measure of PA, was administered by telephone at study entry and exit. It assesses hours spent in sleep, sitting, moderate activity, hard activity, and very hard activity. The self-reported measure of MVPA was the minutes of participation in moderate-to-hard activity.
2. *Stages of Motivational Readiness for Physical Activity*: Coaches completed a five-item instrument [22] to assess their motivational readiness. It is reliable ($k = 0.78$) [23] and has concurrent validity with the 7-day PAR, and stage progression is significantly associated with fitness improvements [23]. Based on their responses, they were classified into Precontemplation (not active with no intention to become active), Contemplation (not active but intending to become active), Preparation (currently active), Action (≥ 150 min of MVPA/week for

- <6 months), and Maintenance (≥ 150 min of MVPA/week for ≥ 6 months).
3. *Functional Assessment of Cancer Therapy Scale-Fatigue* (FACIT-F) [24]. This 13-item scale is a brief, reliable, and valid measure of the physical and functional effects of fatigue. The range of scores is 6 (high fatigue) to 52 (low fatigue).
 4. *Profile of Mood States* [25] is a reliable 65-item measure that taps several mood states including anger, anxiety, depression, vigor, fatigue, confusion, and total mood disturbance (TMD). The TMD is the sum of the scores across six subscales with vigor scores weighted negatively. The POMS has been extensively used in research, and we have used this measure among cancer survivors [26].
 5. *Functional Assessment of Cancer Therapy Scale for Breast Cancer* (FACT-B) is a 55-item scale that assesses QOL and is reliable and valid [27]. The range of scores is 0 to 144, with higher scores indicating a better QOL.
 6. *MOS 36-Item Short Form Health Survey (SF-36)* [28, 29] assesses eight health concepts (e.g., physical functioning, bodily pain). We obtained the Physical Functioning (PF) and Mental Health (MH) scores as well as overall physical and mental health as assessed by the Physical Component Summary (PCS) and Mental Component Summary (MCS) scores, respectively. The SF-36 yields continuous variables that ranges from a low score of 0 (e.g., poor functioning) to a high score of 100 (no limitations, high functioning) on each subscale. The PCS score was obtained by multiplying each subscale z -score by a physical factor score coefficient and summing the eight products. Similarly, the MCS score was obtained by multiplying each subscale z -score by its respective mental factor score coefficient and summing the eight products.
 7. *Confidence in Intervention Delivery*. At study entry, at the end of training, and at study exit, coaches were asked to rate their confidence in intervention delivery (1–5 scale, 1 = not at all confident, 5 = extremely confident). This measure was developed for the study and consisted of four items assessing confidence in asking a participant about her exercise, providing appropriate feedback to participants on their efforts to exercise, providing support for participants' efforts to exercise, and helping participants overcome roadblocks to exercising.
 8. *Study Evaluation*. At study exit, all coaches completed a questionnaire that evaluated the training they received, supervision, and other aspects of their experience as coaches. Likert rating scales were used to obtain their responses (generally, 1.00–5.00 scales). They were asked to provide suggestions on what could be done to make it easier to provide PA counseling. They also provided their responses to an open-ended question: "What did you gain from volunteering with the study?" The written responses to this question were analyzed to identify themes among the benefits identified by the coaches.

Analyses

Coaches' baseline demographic characteristics and medical history were summarized using means (standard deviations) for continuous variables and proportions (n) for categorical variables. In addition, process level variables were summarized over the intervention period, including number of participants/coach, number of phone calls, and length of calls.

Using a series of generalized linear models, changes over time in mean MVPA (minutes/week of MVPA as self-reported on the 7-day PAR) were assessed. As the study was not powered on coach-level outcomes, null-hypothesis significance testing was not the intended goal. Instead, we interpret meaningful effect sizes regardless of their statistical significance in terms of p values [30]. We explored the effects of controlling for baseline variables, including years as a volunteer with RTR, but ultimately, effects did not change significantly with these additional covariates, nor did model fit improve. Thus, the final model adjusts for baseline MVPA only. Note that non-parametric tests were also run and the results were not significantly different from those presented.

Unadjusted proportions were summarized for coaches' motivational readiness at baseline. Using chi-squared analyses, we tested whether these proportions differed at study exit and furthermore described the proportion of coaches who progressed in their stage over time.

We summarized mean values over time in psychosocial constructs. Using a similar modeling strategy to that described above for MVPA, we tested changes over time in these constructs. Using a series of paired sample t tests, we assessed whether there were significant changes in the mean confidence score between study entry and post-training and post-training to study exit.

We provided mean values for the end-of-study rating scale evaluations. Four coaches provided suggestions on how to make it easier to provide PA counseling. Fifteen coaches provided written responses to the open-ended question on the potential gains from study participation. Two team members (BP and KS) working independently identified the themes across the responses. There was consensus on all themes identified except one subtheme which was resolved in discussion by the two members.

RESULTS

Coach characteristics at baseline are presented in Table 1. Among the 18 coaches, average age was 54.89 (7.76), the majority reported being married or living with partner (81.0%) and highly educated (90.5% reported at least some college level education). On average, coaches were diagnosed 7.00 years ago ($SD = 4.67$) and reported being RTR volunteers for 4.47 years ($SD = 3.71$). Each coach delivered the interventions to 1 to 13 participants with a mean of 4.2 participants/coach, $SD = 2.98$. The average number of calls per coach was 44.89 ($SD = 31.83$), with

Table 1 | Summary of coach demographics at study entry^a

	Coaches (N = 18)
Age, years	54.89 (7.76)
Marital status, (% married/living with partner)	81.0%
Race, % Caucasian	95.2%
Ethnicity, % Hispanic/Latino	0%
Education, % at least some college	90.5%
Employment, % full time	33.3%
Income, % ≥40,000	92.3%
Stage	
0	5.3%
1	36.8%
2	47.4%
3	10.5%
Mean years since Diagnosis	7.00 (4.67)
Treatment	
Lumpectomy	60.0%
Mastectomy	25.0%
Radiation	88.9%
Chemotherapy	95.0%
Hormone treatment	90.0%
Mean years of volunteering with RTR	4.47 (3.71)

^a Previously published in Health Psychology, 2015

range 0–145. The average length of RTR Control calls/coach was 11.94 min, and average length of PA + RTR calls/coach was 14.53 min.

Sixteen coaches provided baseline MVPA data, and 17 provided MVPA at study exit. At study entry, their mean MVPA was 223.75 min/week (SD = 283.64) and 179.71 min/week (SD = 118.17) at study exit. On average, there was a mean decrease in MVPA of 55 min/week (SD = 222.73), but there was no significant within-coach change in MVPA over time and effect size was considered small, $d = 0.25$.

At baseline, 11 coaches (61.1%) were categorized in the Maintenance stage of motivational readiness, 5 (27.8%) in Action, 2 (11.1%) in Preparation, and 4 (22.2%) in Contemplation. At study exit, a majority of the coaches remained in the same stage of readiness (61.1%), while four progressed (22.2%) and one regressed (5.6%) (missing data, $n = 2$), indicating a nearly significant difference ($\chi^2 [df = 9] = 16.67$, $p = 0.54$).

Mean values for psychosocial constructs over time as well as corresponding change scores are presented in Table 2. Results did not suggest significant changes over time in any of the constructs, and effect sizes were all considered small (ranging from 0.002–0.27).

Coaches' mean confidence in intervention delivery was high at all three time-points (baseline, mean = 4.22[SD = 0.65], post-training, mean = 4.42 [SD = 0.51], and at study exit, mean = 4.35[SD = 0.64]) with no significant changes over time ($p > .05$).

As seen in Table 3, participants evaluated the training and supervision favorably and did not identify significant barriers to intervention delivery. The suggestions for making it easier to deliver PA counseling included “find ways to record the calls from a cell phone” ($n = 2$), “embed the coaches in the study and have them record their activity-with and without support-over the course of their involvement” ($n = 1$), and “provide more current information in weekly booklets” ($n = 1$).

Table 2 | Mean psychosocial constructs at study entry and study exit and mean unadjusted changes over time

	Study entry	Study exit	Change score ^a	Effect size
FACIT-F	47.31 (4.14)	48.00 (4.49)	0.69 (4.74)	0.15
POMS Total Mood Disturbance	−1.31 (15.31)	−3.13 (18.87)	−1.81 (13.53)	0.13
FACT-B total	120.96 (20.81)	122.61 (13.27)	1.65 (12.44)	0.13
SF36 Physical Functioning Subscale	92.81 (8.94)	94.06 (8.98)	1.25 (11.18)	0.11
SF36 Mental Health Subscale	83.44 (10.91)	84.38 (8.34)	0.94 (9.70)	0.10
SF36 Physical Component Score	54.07 (4.19)	52.89 (9.23)	−1.18 (6.97)	0.17
SF36 Mental Component Score	55.70 (7.70)	57.40 (5.97)	1.70 (6.28)	0.27

Change scores correspond to study exit minus study entry. Effect size corresponds to a Cohen's d

^a No significant changes over time, $p > .05$

Table 3 | End of study evaluations ($n = 17$)

Evaluation component (rating scale)	Mean rating (SD)
Usefulness of training (1.00–5.00 scale, 1 = not at all, 5 = very useful)	4.70 (0.60)
Helpfulness of bi-weekly supervision (1.00–5.00 scale, 1 = not at all, 5 = very helpful)	4.12 (0.96)
Recommend volunteering with the study (1.00–5.00 scale, 1 = definitely not, 5 = definitely yes)	4.81 (0.40)
Ease of intervention delivery (1.00–5.00 scale, 1 = very difficult, 5 = very easy)	
Fit the calls into your schedule	3.81 (1.11)
Reach participants by phone	4.25 (0.86)
Use the call log	4.69 (0.60)
Use the recording equipment	4.12 (1.20)
Discuss past week's exercise	4.77 (0.44)
Ask about health symptoms	4.85 (0.38)
Provide feedback on progress	4.69 (0.48)
Help to overcome roadblocks	4.15 (0.80)
Provide support for exercise efforts	4.62 (0.65)
Help plan ahead for roadblocks	4.31 (0.86)
Barriers to intervention delivery (1.00–5.00 scale, 1 = not at all, 5 = very much)	
Not enough time	2.19 (0.98)
Difficulty reaching participants	2.00 (1.10)
Using the call log	1.25 (0.78)
Completing paperwork	1.25 (0.78)
Speaking bi-weekly with research staff	1.10 (0.54)
Length of weekly calls to participants (1.00–5.00 scale, 1 = too short, 3 = just right, 5 = too long)	3.13 (0.34)
Number of calls (1.00–3.00 scale, 1 = too many, 2 = about right, 3 = too few)	2.00 (0)

Table 4 | Themes and sample responses of gains by coaching

Theme	Responses
Helped others	Felt I was able to make a difference in others' lives Glad I could help motivate them to exercise Helped someone who had a couple of health issues I was giving back to a cause that means a lot to me. Extremely rewarding to have helped women succeed and feel positive both physically and emotionally
Helped myself	A certain sense of purpose in helping out I felt good that I was being proactive.
Subtheme: sense of worth/purpose/confidence	Gained confidence in speaking with strangers
Subtheme: gained friendships/relationships	Met some wonderful women by phone Gained a few more friendships Enjoyed interactions with study participants and staff Great relationships with participants
Subtheme: exercise	Helped me to be more accountable with exercise plans Need for exercise in my own life Finally started walking regularly Reminder of one's own healthy lifestyle
Subtheme: developed skills	I became a better listener. Training provided good coaching techniques. I overcame a bit of shyness making cold calls. Realization that I am able to motivate others and relate easily to others

Qualitative data on gains—There were two main themes of gains to the coaches: helping others and helping themselves (see Table 4). Representative statements of “helping others” included “I was glad that I could help motivate them to exercise” and “Extremely rewarding to have helped women succeed and feel positive both physically and emotionally.” The “helping themselves” theme had four subthemes: (1) Study participation provided a sense of worth/purpose and confidence (e.g., “I felt good that I was being proactive” and “Gained confidence in speaking with strangers”). (2) Coaches developed relationships (“I met some wonderful women by phone” and “I enjoyed interactions with study participants and staff”). (3) The study helped them to stay physically active (e.g., “Helped me to be more accountable with exercise plans” and “Finally started walking regularly.”). (4) Coaches developed skills (e.g., “I became a better listener” and “Training provided good coaching techniques.”).

DISCUSSION

This study is one of the first to systematically explore the effects of delivering an MVPA intervention among breast cancer survivors who volunteered with the study as peer mentors. Anecdotal data from the pilot study [16] suggested that these peer mentors/coaches benefitted, but little was known about the specific benefits. Our results demonstrated that the coaches did not significantly change their self-reported MVPA nor did their psychosocial well-being change significantly (in either a positive or negative direction). However, our qualitative data revealed that they did accrue benefits.

We hypothesized that the coaches would increase their own MVPA during study participation based on our pilot study. However, the quantitative data (7-day PAR) did not support the hypothesis. These results are consistent with those of Castro and colleagues [15] who also assessed coaches’ MVPA at baseline and study end. It should be noted that our coaches’ mean MVPA at study entry and exit exceeded the national recommendations of at least 150 min/week of MVPA [4, 31]. Hence, coaches may have perceived little need to further increase their MVPA. This possibility is supported by the finding that a majority of coaches were in the maintenance stage of motivational readiness for MVPA (61.1%) at study entry and a majority stayed in the same stage at study exit. Despite the absence of significant changes in self-reported MVPA, motivational readiness data and our qualitative data do suggest that a few coaches reported that the study helped them stay active (a subtheme of “helped myself”).

Our second hypothesis was that the coaches would improve their psychosocial well-being (specifically, improvement in mood, fatigue, quality of life, and health status). Again, there were no significant changes in either a positive or negative direction. Coaches’ baseline scores were high indicating that they were

not limited by sequelae of their cancer treatments (they were approximately 7 years post-diagnosis). Their high scores may have created a ceiling effect and limited the scope for further improvement.

The most insightful data on the benefits of coaching were obtained in the responses to the question on “what did you gain from your study participation?” Here, we found that coaches reported that they helped others and they helped themselves by assisting with intervention delivery. The specific ways in which they helped themselves (e.g., gained relationships and learned new skills) were not captured in the standardized measures of fatigue, mood, quality of life, and health status. This suggests that future research on the effects on peer mentors use measures that “tap” into the specific benefits that coaches accrue. There are standardized measures for reasons for volunteering [e.g., 32]. To our knowledge, these measures are not often used to examine the extent to which the volunteering experience fulfills these reasons.

The recruitment of coaches suggests that there may be potential barriers to scaling up the intervention to the community. We were not able to collect data on why volunteers did not respond to recruitment efforts and can only speculate that reasons may have included time requirements for the study (which exceeded the requirements for volunteering with RTR, that is, making one to two calls per patient), reduced engagement with RTR, and lack of interest in promoting exercise. That said, the coaches who volunteered evaluated the training and supervision positively and found it easy to deliver the intervention. They evaluated the number of calls per participant and the length of the calls to be “just right.”

The strengths of our study lie in our systematic exploration of effects of intervention delivery using a pre-post design. Our coaches had already received training in listening and other counseling skills as part of their RTR training. We paid careful attention to coach training and provided them guidance and feedback during intervention delivery. Their confidence in intervention delivery was high throughout their study participation. Finally, coach retention was excellent (17 of 18 coaches provided data at study exit; one coach was deceased during the study). Study limitations include the absence of a comparison group of coaches who did not deliver the interventions, and hence, our pre-post study design cannot preclude other reasons for the study results. Additionally, although we received no reports of adverse effects to the coaches, they were not asked a specific question on disadvantages or burdens associated with their study roles. Further, our sample was a select, well-educated homogenous group and our measure of MVPA is self-report. Lastly, our coaches were physically active and did not report distress, high fatigue, or poor quality of life at study entry: while we acknowledge these as limitations, it may also be important to ensure that the coaches were physically active themselves so that they can be effective role models in helping others adopt MVPA. Additionally, our coaches were not distressed or otherwise impaired by fatigue or poor

quality of life and that may have also contributed to their effective support of study participants. While it may be desirable to recruit coaches who are physically active themselves and in good psychosocial functioning, it may be unrealistic to expect significant improvements in these outcomes. Thus, assessing other types of benefits, such as those identified in our qualitative data, and other variables such as a sense of accomplishment, warrants further consideration.

As pointed out earlier, little is known about intervention delivery effects on the delivery agents. The paucity of data is not surprising when interventions are delivered by paid research staff. However, exploring the effects of intervention delivery may be much more relevant to volunteers and their sponsoring organizations. It will be important to ask both about gains and adverse effects on coaches due to the implications for future collaborative work. Researchers may need to be aware of the risk involved in systematically assessing the effects of intervention delivery on volunteers. It is possible that there may be unintended negative effects to the peer mentors/coaches that the researchers and the community organization will then need to address.

The study results are very useful for future work on dissemination and implementation of the MVPA intervention and for interventions that are being scaled up by partnering with peer-based programs. For example, the benefits that the coaches identified in their written responses are currently being used in coach recruitment in an on-going trial (R01 CA183849).

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Compliance with ethical standards The study received approval from the Institutional Review Boards at The Miriam Hospital (RI) and Women & Infants Hospital (RI). All coaches provided written informed consent. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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