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J Aging Phys Act. Author manuscript; available in PMC 2024 February 29.

Published in final edited form as:

J Aging Phys Act. 2023 February 01; 31(1): 59–67. doi:10.1123/japa.2022-0013.

Adapting an Evidence-Based Exercise and Education Program for Older Breast Cancer Survivors for the REJOIN Trial

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Abstract

Physical activity (PA) promotes survival and mitigates symptoms in older breast cancer survivors (BCS), especially to reduce joint pain associated with adjuvant hormonal treatment. The purpose is to describe the adaptation process for an evidence-based exercise and education curriculum (i.e., *Fit & Strong!*) to support older BCS participating in the Using Exercise to Relieve Joint Pain and Improve Aromatase Inhibitor Adherence in Older Breast Cancer Survivors trial. We reviewed all educational materials with scientific/clinical experts to identify necessary content changes. Next, we conducted semistructured phone interviews with BCS to review all educational materials and conducted a real-time pretest for the trial. Overall, BCS found the adapted materials and experience acceptable (mean score of 9.2/10 for satisfaction). Content changes included simplifying exercise instructions, prioritizing content related to the trial goals, and updating photographs. Because of COVID, the pretest was conducted via Zoom. Our multistep adaptation process provided an acceptable intervention to meet the needs of older BCS. Lessons learned will be applied to the forthcoming pilot trial.

Keywords

survivorship; geriatric oncology; symptom management; aging

At present, there are approximately 17 million U.S. adults that have been diagnosed with cancer, of whom 62% are ≥65 years (Bluethmann et al., 2016; Edwards et al., 2014; Siegel et al., 2016). This number is expected to grow to 26 million by 2040, driven by the rising “silver tsunami” of maturing baby boomers (Bluethmann et al., 2016). Breast cancer is the

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most commonly diagnosed invasive cancer among older women; approximately 50% of all breast cancer survivors (BCS) are older than 65 years and diagnosed with postmenopausal disease (Howlader et al., 2011). Many older BCS have age-related impairments, which may exacerbate treatment side effects and negatively affect quality of life for years after primary cancer treatment (Naeim et al., 2014). Early treatment side effects, like pain and sleep disturbances (Mustian et al., 2012), in addition to late effects, like diabetes and osteoporosis, are common for BCS (Bellury et al., 2011). Physical activity (PA) is underutilized yet essential for mitigating treatment-related side effects (Ballard-Barbash et al., 2012). Programs like *Fit & Strong!* an evidence-based self-management program for older adults with chronic conditions, evolved specifically to address this need, yet has not been well-studied in older adults with cancer history.

The American Cancer Society (ACS) and other organizations recommend survivors achieve a minimum of 150 min of moderate-intensity PA or 75 min of vigorous-intensity PA, plus ≥2 muscle-strengthening sessions per week (Campbell et al., 2019; Denlinger et al., 2014; Kushi et al., 2012). Further, the American College of Sports Medicine published adapted exercise guidelines for cancer survivors, based on recovery stage, from rehabilitation to long-term recovery (Schmitz et al., 2010; Wolin et al., 2012). Despite the benefits, as few as 10% of BCS achieve recommended amounts of PA (Smith & Chagpar, 2010; Underwood et al., 2012). Older survivors are chronically understudied (Hurria et al., 2015), but the benefits of PA and lifestyle research for them are paramount (Chakravarty et al., 2012; Demark-Wahnefried et al., 2015). Still, few PA programs are designed with geriatric needs in mind.

The majority of BCS are postmenopausal with hormone-receptor positive tumors, for which aromatase inhibitors (AIs) are the recommended treatment (Chlebowski et al., 2014; Mayer & Burstein, 2015). Based on survival benefits (Arimidex, Tamoxifen, Alone or in Combination Trialists' Group et al., 2006; Davies et al., 2013), experts first recommended continuous AI use as adjuvant hormonal therapy for 5 years after primary cancer treatment, but now may be extended for up to 10 years after completion of primary cancer treatment in select groups (Burstein et al., 2010, 2014, 2016). Unfortunately, BCS do not complete therapy as recommended, owing partly to unmanaged symptom burden (Bluethmann et al., 2017; Fontein et al., 2013; Murphy et al., 2012). Arthralgia, which includes joint pain and rigidity, is a known but poorly understood AI side effect affecting up to 50% of AI users and continues to be a major reason for early AI discontinuation in BCS, especially in older patients with prior musculoskeletal conditions (Burstein, 2007; Cahir et al., 2015). Despite the pervasiveness of AI-related arthralgias ("arthralgia"), the etiology of this challenging side effect remains undetermined (Gaillard & Stearns, 2011; Niravath, 2013). Treatment strategies often include nonsteroidal anti-inflammatory drugs, which provide short-term arthralgia relief, but may have their own problematic side effects (e.g., dizziness, stomach upset; Gaillard & Stearns, 2011). Increasingly, nonpharmacological approaches (such as PA) are needed to provide safe, long-term relief to help survivors address treatment side effects (Jim et al., 2006) and optimize function.

The Using Exercise to Relieve Joint Pain and Improve AI Adherence in Older Breast Cancer Survivors (REJOIN) trial builds on previous studies seeking to address arthralgia

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and AI adherence through education- (Hadji et al., 2013; Heisig et al., 2015) or exercise-only studies (DeNysschen et al., 2014; Nyrop et al., 2014). Programs combining exercise and education are necessary, but previous studies have generally not been adapted for the specific needs for older BCS (Hurtado-de-Mendoza et al., 2016; Niravath, 2013). Further, many previous programs that have included older adults or older cancer survivors have focused on one form of exercise only (e.g., walking; Nyrop et al., 2017), whereas *Fit & Strong!* includes group low-impact aerobic exercise and lightweight training to maximize strength and function, in addition to targeted educational modules to support successful self-management of symptoms.

The purpose of this report is to describe the systematic adaptation process we used and is recommended by the National Institutes of Health/the National Cancer Institute to tailor cancer control programs, including for an evidence-based self-management (exercise plus education) program (i.e., *Fit & Strong!*) (Lorig et al., 1999, 2006; Lorig & Holman, 2003), that will be used in the REJOIN pilot trial to address the needs and preferences of older BCS who are just initiating AIs. Other studies have been conducted to similarly adapt *Fit & Strong!* for unique audiences, including international and non-English-speaking groups (Duarte et al., 2019). Our process is distinctive in that we are targeting older BCS who are just beginning AI treatment, which is a uniquely challenging time for BCS and has not been well studied. We also provide one of the first examples of delivery of this program on a remote platform which became necessary due to the global pandemic. Our broader goal with the REJOIN trial is to intervene with BCS early to proactively address arthralgia and concurrently promote exercise in older BCS, which are both important survivorship goals (Graves, 2003; Lorig & Holman, 2003; McCorkle et al., 2011; Risendal et al., 2015).

Methods

Overview of Aims, Eligibility, and Trial Design

The purpose of REJOIN, a randomized controlled pilot study, was to adapt an evidence-based exercise program (*Fit & Strong!*) (Hughes et al., 2004, 2010) for older adults and test the efficacy of this self-management approach combining education- and exercise-based strategies (treatment group) compared to education only (control group) for improving arthralgia in older, female BCS (≥65 years). There are three study aims: (a) adapt an evidence-based PA intervention based on educational needs of older cancer survivors planning to take AIs, (b) test the effect of the intervention on arthralgia and behavioral predictors for medication adherence, and (c) test the effect of the intervention on adherence to AIs over time.

For REJOIN, we recruited female BCS who were 65 years and older, have completed primary breast cancer treatment, and are eligible for adjuvant hormonal treatment. We worked with clinical oncologists as well as community groups to identify eligible participants for recruitment. Gift cards and other incentives were provided to those who were eligible and enrolled (see “Adaptation Procedures” section).

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This report is focused only on Aim 1 and describes the steps for adaptation and pretesting for the product that is being used in the main pilot. Additional details about the REJOIN pilot study design, measures, and methods are reported elsewhere (Bluethmann et al., 2021).

Selection of *Fit & Strong!* Curriculum for Older BCS for Primary Intervention

The team used the National Institutes of Health/National Cancer Institute's Research-Tested Interventions Programs resource (now known as Evidence-based Cancer Control Programs) to identify *Fit & Strong!* as a viable program option for the research questions of interest. The *Fit & Strong!* program has specific evidence for its acceptability with older adults; its effectiveness in addressing osteoarthritis (a condition that may also lead to arthralgia); and its combination of resistance training, aerobic exercise, and educational sessions intended to promote self-management skills (Hughes et al., 2004, 2006; Seymour et al., 2009).

Prior to enrolling participants, a license to conduct the *Fit & Strong!* program was purchased through the *Fit & Strong!* program office (Institute for Health Research and Policy at the University of Illinois at Chicago). Additionally, the team instructors completed a *Fit & Strong!* master training session. The program supplied instructional manuals for the instructors to lead modules and participant manuals for participants to use. Two of our research team members (Grotte and Heitzenrater) were exercise trainers certified by the American College of Sports Medicine. These trainers participated in the adaptation of *Fit & Strong!* and consulted on manual content revision and pretrial preparations, including suggesting appropriate exercise modifications for our program participants.

Participants in the pretrial had exercise equipment available as recommended by *Fit & Strong!* This included resistance bands for arm exercises, and two, 5-pound adjustable ankle weights for leg exercises.

The REJOIN trial protocol was approved by the Institutional Review Board at The Pennsylvania State University College of Medicine and complies with the guidelines of the Declaration of Helsinki. All participants in adaptation steps, and the pilot provided their consent (either written or verbal) in compliance with Institutional Review Board requirements. More details about the REJOIN pilot study design, measures, and methods are reported elsewhere (Bluethmannetal., 2021) and on ClinicalTrials.gov (NCT03955627).

Adaptation Procedures

The Research-Tested Interventions Programs website provided guidelines for adaptation of evidence-based health promotion programs to address specific needs of special populations (Boyle & Homer, 2006; Krivitsky et al., 2012), including older adults and cancer survivors. The adaptation process included iterative steps to adapt the intervention in preparation for conducting a randomized pilot trial with older BCS (see Figure 1). Our process was informed by these steps:

a. *First*, the research team worked with an advisory group of scientific and clinical experts with relevant training to advise on content modifications to increase safety and efficacy for older BCS. These included experts in exercise oncology, breast oncology, geriatric oncology, rheumatology, and primary care to identify

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content areas that needed to be adapted to fit the needs of older BCS. Based on expert review, a preliminary list of changes was generated to guide further revision.

b. *Second*, the team recruited three older BCS from Penn State Health and through community organizations to review and mark up the proposed intervention materials and participate in one-on-one, in-depth phone interviews to assess readability, clarity, and cultural appropriateness of content. The interviewer (Flores) was trained in cognitive interviewing strategies (Willis, 2004) and used a standard interview guide with these three first participants to guide the conversation. Each participant was mailed a copy of the participant manual and encouraged to mark up with any notes or comments. Interviews were approximately 60 min long, recorded, and transcribed verbatim. Transcripts were used for thematic content analysis (Hsieh & Shannon, 2005; Strauss & Corbin, 1990), as well as for identification of specific technical changes (image changes, wording changes, organization of materials, etc.). Each participant received a $30 gift card for their time. To enhance rigor of qualitative analysis, a second coder (Bluethmann) reviewed transcripts and confirmed codes with the first coder (Flores) to discern themes (Hsieh & Shannon, 2005) and required changes. Recommendations from both the expert advisors and participants were combined into a single spreadsheet for the team to use to guide necessary changes to participant materials.

c. *Third*, the revised versions of the educational materials underwent a final test through an “open pilot” to pretest the appropriateness of the adapted intervention with older BCS (Stull et al., 2007). In this step, three new eligible participants participated in a pretest of exercise and educational modules and provided feedback through a final set of semi-structured, one-on-one interviews. All participants were offered a real-time, 4-hr compressed version of *Fit & Strong!* modules, with a balance of exercise and educational content conducted via the Zoom video platform. The education session focused on three modules: Session 3: AIs; Session 8: walking; and Session 11: posture and bone health. The three modules were selected based on key points the study team identified as essential for safety and relevance to study end points. They were also informed by questions raised during the initial participant interviews, related to medication status and relevance to the older BCS population. As part of the final follow-up interview, participants were asked to rate their satisfaction with the final set of materials and session on a scale from 1 (*low satisfaction*) to 10 (*highest satisfaction*). It was predetermined that a revised intervention would be considered acceptable if it received a mean satisfaction rating of 7 or higher from participants. Based on these assessments, required modifications were made and the intervention is moving forward. All participants in this step also received $30 gift cards for their participation.

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Results

The following are results from the adaptation steps described in Figure 1.

Step 1: Summary of Changes Based on Preliminary and Expert Review

While general information about healthy living for older adults was retained from the original *Fit & Strong!* program, it was reframed for REJOIN based on recommendations about survivorship from the ACS, including guidance about PA and weight management (Rock et al., 2012; Runowicz et al., 2016). Additionally, information about the purpose of adjuvant hormonal therapy and common side effects from AIs (such as arthralgia) was added, guided by patient-friendly web material from the ACS (https://www.cancer.org/cancer/breast-cancer/treatment/hormone-therapy-for-breast-cancer.html). The Scientific and Medical Advisory Committee included five experts, covering the areas of exercise oncology, breast oncology, geriatric oncology, rheumatology, and primary care to identify content areas in the program that should be adapted to fit the needs of older BCS.

Collectively, the advisors recommended reducing content on non-breast-cancer-specific topics. For example, the original *Fit & Strong!* program included several sections about foot care and diabetes management, but these were removed. More information was added about when to stop exercising and understanding signs and symptoms when starting a new exercise program. For example, based on the advisors' suggestion, we added some messages reassuring participants that mild muscle soreness after workouts was normal and healthy. Our advisors suggested removing any resistance training exercises that required cross-body or overhead lifting, as this could cause discomfort for women who had had mastectomy surgeries. As exercise terminology was used throughout the manual, we also added a glossary of important terms. Photographs were also updated to ensure an inclusive representation of older women with diverse backgrounds.

The senior exercise oncology advisor, in cooperation with the exercise physiologists (i.e., trainers) on the research team, identified necessary adaptations to the aerobic and resistance training portions of the program. Consistent with the preferences of many older survivors and older adults (Nyrop et al., 2014), walking was the primary mode of aerobic exercise used with most of the program. The exercise trainers recommended adding more variety to the aerobic activities, by including stationary aerobic exercises, such as high-knee marching, chair squats, heel kicks, and so on, that would still be appropriate for older adults. While the original *Fit & Strong!* program calls for completing lower body exercises, the REJOIN team prioritized inclusion of both lower and upper body resistance training, as it was recognized that BCS may have decreased upper body strength after cancer treatment and would benefit from full-body training. For consistency with the 60-min class timeframe planned with *Fit & Strong!* aerobic progression in REJOIN was reduced by 5 min for Weeks 4 and 5 in the overall 8-week group program to accommodate the addition of these upper body exercises. The exercise trainers identified one resistance exercise activity in *Fit & Strong!* that involved a diagonal lift that could cause discomfort for BCS who had had breast surgeries or other upper body restrictions (Stubblefield & Keole, 2014). This exercise was removed from the REJOIN program. All other exercises in *Fit & Strong!* were deemed safe and appropriate for the target population of older BCS in REJOIN.

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Step 2: Results From First Set of Interviews With BCS

For the phone-based, one-on-one interviews, the three participants were BCS ranging in age from 67 to 70 years old (mean age 69 years). Two participants were White and one was African American. One lived in a rural community and the others were from suburban or urban settings. All verified that they had taken AIs as part of their breast cancer treatment. Following the three main topics in the interview guide, the interviewer focused on questions related to readability, clarity, and cultural appropriateness of the participant manual.

For readability, all three participants in this step generally liked the format, but commented on confusing terminology. This included the trial name, REJOIN, which appeared on the cover, participants asking for the acronym to be defined. One participant wanted more introduction ahead of the table of contents, explaining what participants could expect. She said,

> (I wanted a) little bit of an explanation before this outline, so that I had some idea of what was going to happen . . . just how does this fit together? Like . . . you know, what's my involvement gonna be? (Participant 1–1)

Additionally, one participant suggested reordering some topics to prioritize the AIs focus. She said,

> Since the attempt is to deal with the AI, I thought that maybe most important would be to start with information about the AIs and facts. And then a section on how you manage (potential side effects from) AIs through exercise. (Participant 1–2)

For clarity, participants were asked specifically about two tools used in the curriculum to help exercisers self-assess their level of exertion. This included the Rate of Perceived Exertion Scale and the Talk Test (Borg, 1998; Williams, 2017), which are both illustrated and explained in the manual. Two of the three participants misunderstood the Rate of Perceived Exertion diagram, which asks participants to rate their exertion on a scale of 1–10. One said, "The rate of perceived exertion I read it to mean the . . . pulse rate. I mean, it's somebody uh would be . . . stressing or working their heart up to a certain level, like on a treadmill" (Participant 1–2). The Talk Test appeared to be more readily understood. When asked to explain what this was, one participant said, "I'm thinking that if you're doing too much exercise, you can hardly talk you can't get words out. But if you're able to breathe and talk appropriately and more than likely within the range" (Participant 1–3). Another expressed that she understood this concept without difficulty, saying that it was a "simple way" to check how hard they were exercising.

The BCS interviewed appreciated the structure of the manual and its inclusion of photos as well as descriptions of specific exercises. However, there were several places where the participants did not feel the photos were clear or that the corresponding instructions were not clearly explained. For example, one participant noted that the "ankle pump" exercise described using a chair to position the body; however, the picture showed the use of a long bench. The description of the exercise was reworded to remove "chair" and include "bench or bed" in its place to more accurately reflect the picture and ensure participants complete the exercise properly, whether in an exercise studio or at home.

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All participants also noted lack of clarity on positioning of resistance bands and suggested that some photos and related descriptions could be modified to more clearly display equipment and proper placement needed for exercise performance. Additionally, the pictures for the biceps curls and overhead press also did not plainly show where the exercise band should be placed during the exercise. New pictures were added that demonstrated that the participant should sit on the band for overhead press and stand on the band for biceps curls.

For cultural appropriateness, we responded to any participant comments concerning relatability, including context of examples and images. Each of the three participants provided suggestions for preferred exercise types, many of which were associated with their neighborhood. One participant said she “adored tai chi and holistic movement” (Participant 1–2) in local classes. The others mentioned walking in the neighborhood or dance classes in neighborhood community centers. For music preferences, two participants preferred dance music from the 50s and 60s (the era in which they were young adults). The other participant preferred gospel music, saying, “gospel music is the only thing I listen to” (Participant 1–3).

The mismatch of included photographs and intended participants was mentioned as a concern. One participant said, “ . . . Most of (people pictured) look like they’re fit millennials. And if you’re trying to approach people who are 65 and older, I think the images ought to have more to do with the 65 and older” (Participant 1–2). To respond to this concern, we recruited a retired local trainer who was willing to be photographed and demonstrate proper exercise techniques to be used in our educational materials (Figure 2).

Step 3: The Pretest and Postadaptation Interviews With Participants

The three participants in the pretest and final interviews were BCS ranging in age from 68 to 73 years old (mean age 70 years). All three participants in this step were White and verified that they planned to take taking AIs as part of their breast cancer treatment. They also consented to have their deidentified images used in educational and promotional materials for the study. Similar to the first set of interviews, the interviewer focused on questions related to readability, clarity, and cultural appropriateness of the participant manual. Additionally, the interviewer asked questions on the education and exercise modules they attended, as well as the research surveys they completed (for practice only) at home. A copy of the interview guide is provided in the Supplementary Material (available online). A collection of exemplar quotes from participants about their experience with the REJOIN program were identified and summarized in Table 1.

When reviewing the revised manual, participants reported that they felt the manual had good readability (Table 1). All three participants reported that they were aware of their own fitness level and stated that future participants should be able to adjust exercises to their own ability and comfort level. One participant with a lot of exercise experience felt some language in the exercise manual was overly simplified; however, this did not necessarily deter her from performing the exercises. Additionally, she suggested that barriers (physical and/or environmental) for each participant should be determined prior to program initiation (Table 1). Instructions for the Rate of Perceived Exertion Scale and the Talk Test, tools previously described, were included in the revised manual. All three participants confirmed that the newly added instructions were clear. When asked about usability of the exercise

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log, a tool to help participants record exercises they do at home, it was noted that it was easy to understand and complete. One participant preferred to have more guidance on selecting exercises on the log itself (Table 1). The pilot version of REJOIN includes extensive information on how to choose exercises and opportunities to consult with the exercise coach on appropriateness for each individual.

Three sessions were included in the educational module of the pretest adaptation. Throughout the module, participants were engaged and curious with many questions and stories to contribute to the group. Participants stated, they were concerned that 3 hr of education would feel long and tedious, but were surprised with how quickly time passed and how much they enjoyed the experience. One session, “walking,” included walking techniques and walking benefits, including increased heart rate, bone strength, blood flow, and energy. One participant, a regular walker, appreciated the walking technique reminders, which she said are “sometimes are overlooked with repetition” (Table 1). In another session, “AIs,” participants said they were generally aware of the benefits of exercise, but also receptive to the positive effects of exercise for BCS undergoing AI treatment (Table 1).

Prior to conducting the exercise modules, an equipment orientation was provided. Participants expressed that a separate equipment orientation combined with a Zoom orientation, would be helpful prior to the start of the session (Table 1). The instructor provided short breaks every hour, which the participants thought were helpful and aided in the flow of the session. Throughout the exercise portion, participants engaged in various exercises led by the trainer. Camera angle was an issue for one participant as she had to keep adjusting her laptop position each time she changed from seated to standing. One participant recommended grouping and performing all the upper body exercises first followed by all the lower body exercises, or vice versa (Table 1). It was suggested that an equipment and Zoom orientation session prior to the start of the program could help reduce issues such as these, as it will give the study team a chance to assess the space participants are using for the sessions and help adjust positioning prior to exercising. One participant indicated that the equipment (bands and ankle weights) provided many options for exercise (Table 1). The exercise trainer had intended to utilize music during the exercise portion, but due to technical difficulties, was not able to play any music. When asked if participants would prefer music with their exercise classes, participants said that they liked music but it could be a distraction, especially for the initial sessions where instructions need to be heard clearly (Table 1). However, they expressed that music could be helpful and enjoyable during the exercise classes as one becomes familiar with the exercises and progresses through the program.

Overall, all three pretest participants stated that the adapted intervention was well executed and had good flow. Despite the change from an in-person to a slightly longer online delivery format, participants felt the time went by quickly. Participants indicated that the instructor and pace of instruction were agreeable and fostered a sense of encouragement and positivity among the group. All our participants valued the physical benefits of exercise, and described that the fellowship with other BCS in the group made the sessions more enjoyable and encouraging (Table 1).

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All three participants reported being very satisfied with the adapted exercise and education sessions, exceeding expectations for satisfaction levels required to proceed with this version (mean = 9.2; range: 8.5–9.5). Suggested improvements were largely related to the online format, including recommendations for a small class size (up to 4–5 people) and re-ordering of exercises, like starting with upper body exercises first to simplify positioning of the video camera.

Discussion

The objective of the research described was to systematically adapt the curriculum for an evidence-based self-management intervention to serve older BCS just initiating adjuvant hormonal therapy. Building on the strong evidence of both the efficacy and acceptability of Fit and Strong! with older adults (Hughes et al., 2004, 2006; Seymour et al., 2009), in addition to review from our panel of expert reviewers, an in-depth evaluation from community-dwelling BCS, and an overall satisfaction rating of 9.2/10 from BCS, we are confident that the adapted product is acceptable to our target participants and will accomplish our research goals. In our case, most of the changes identified by participants were not extensive. Many changes we made were about adding breast-cancer-specific content, clarity of phrasing, conciseness of and visual representations of tools, and exercises that would enhance use of participant materials.

Given the changing research requirements necessitated by the global pandemic, this adaptation process represented extensive efforts to accommodate new and fluctuating regulatory standards and constant attention to the needs, preferences, and safety of our BCS participants. Other exercise programs that were originally developed for in-person use and rapidly converted to remote implementation because of the pandemic, such as Gerofit-to-home program, encountered similar challenges to our effort to adapt *Fit & Strong!* to a tele-exercise model (Jennings et al., 2020). In that case, participants who had no access to technology and did not receive technology coaching were not able to fully participate. However, individuals that did participate found benefits such as reduced social isolation and maintenance of physical function (Jennings et al., 2020). In spite of this and in fact because of this, we feel that the REJOIN product we adapted is especially robust and relevant for the times. Clinicians have recognized the importance of exercise to maintain strength and resilience for older adults, during a pandemic and in the face of other health threats (Newton et al., 2020). We also feel that despite the initial hesitation to provide exercise classes to older adults on an entirely remote platform, one in which many older adults are not experienced, that the success of the pretesting efforts is a powerful indicator for future pilot testing in a remote format with similar BCS or other older adults with similar needs.

As with any adaptation process, there is always a possibility that certain changes were missed or not implemented in an ideal way. Trying to recruit participants during the pandemic was extremely challenging, but we were satisfied with both the quality of participants and the extent of their active participation in our adaptation process. Our sample size for the adaptation activities was much smaller than what we hope to accrue for our full pilot. However, given the qualitative focus of the adaptation phase, we were satisfied with the richness and specificity of the narrative data we collected and were able to immediately

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apply to our products for the next step in our trial. We have described extra steps taken to try to avoid missing any necessary changes in content or presentation, but also will be carefully evaluating the results from the forthcoming pilot to assess any additional adjustments or refinements that would be required for a larger, efficacy trial in the future. This may include additional testing with more ethnically diverse audiences and potentially a hybrid format (remote classes and/or in-person classes), if these can be provided safely.

The hope is that this description of our adaptation strategies and process will be informative for others seeking systematic guidance for adapting evidence-based PA programs for older cancer survivors. It is also supportive of the broader need to design more programs with the needs of older survivors in mind, especially in relation to opportunities with technology for patient engagement. As we look further down the road for effective and pragmatic ways to deliver exercise and education to older cancer survivors at home, we hope that REJOIN can be a tool in the toolbox for long-term recovery.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Dr. Bluethmann is supported by a Mentored Research Scholar Grant in Applied and Clinical Research, MSRG-18–136-01-CPPB, from the ACS and a developmental grant from the Penn State Cancer Institute/Highmark Corporation. The content is solely the responsibility of the authors and does not necessarily represent the official views of ACS.

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Figure 1 —.
Process steps for adaptation.

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Figure 2 —.
Example of updated photograph for participant materials.

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Table 1

Postadaptation Interview Quotes

Topic	Quote
Educational modules	
Manual readability	" … everything was done in a way that was easy to read and—and visually appealing." (Participant 1–6)
	"was very familiar with most of what was presented." (Participant 1–6)
	"kind of felt like talking down to me." (Participant 1–5)
Manual clarity	"I personally would like it more structured." (Participant 1–6)
Walking session	"… it was a reminder to keep my—be aware of my posture and, uh, keep my eyes ahead instead of looking down. So yes, there were helpful hints there. Even for someone who walks as much as I do, there were definitely some helpful hints there." (Participant 1–6)
Aromatase inhibitors session	"Oh I believe that exercise helps joint pain, whether you're on a drug or whether you're not on a drug." (Participant 1–6)
Exercise modules	
Equipment orientation	"I think that by the time we got to the exercise, (we actually got) to save a few minutes for an orientation on the equipment. I thought it was effective as it was being done." (Participant 1–7)
Exercise equipment	"There's a lot of exercises you can do with (resistance bands)." (Participant 1–5)
Music	"You know, I think you—I think you have to be careful with music because it can be very distracting. Because first of all, you can't hear as well." (Participant 1–6)
	"So, um—so the music, to answer your question, yes. Once you know you—what you're doing, you can put the TV on or whatever, radio, or … whatever helps you. But when you're teaching somebody like this, especially virtually (music can be tricky)." (Participant 1–5)
Order of exercises	"But the point is that in doing this, you know … I think it was very good. I—the only other thing I told [name redacted] was that I would do maybe all the upper exercises, arm exercises first … . And then the lower body … . Because I had to keep moving my screen— … . Because it's virtual … . So, you know, I kept moving it. And then I had to readjust my (camera) —so no. I thought—I thought it was very good." (Participant 1–5)
Overall perceptions	"I thought (the length of the session) was going to be tedious, (but) it went fast." (Participant 1–5) "I thought was pretty well rounded." (Participant 1–6)
	"It gave me some confidence and, and it established in my mind that, you know, this is what I need to do to move forward." (Participant 1–7)