



Delivering exercise medicine to cancer survivors: has COVID-19 shifted the landscape for how and who can be reached with supervised group exercise?

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Abstract

Purpose Due to stay-at-home orders during COVID-19, we transitioned supervised, group, in-person resistance training interventions in two clinical trials in cancer survivors to live, online delivery using video-conferencing technology. We describe the feasibility, preliminary efficacy, and safety of live online group training and compare to in-person training.

Methods Adherence (% sessions attended), retention (% participants completing intervention), and safety (# adverse events) data of resistance training groups from two randomized controlled trials in cancer survivors that participated before or during the COVID-19 pandemic were collated. Participants were post-treatment breast cancer survivors and their spouses ($n = 62$) and prostate cancer survivors ($n = 32$) (age range: 38–82 years). During COVID-19, delivery of supervised, group resistance exercise sessions was delivered live online via video-conference. Preliminary evidence for training efficacy was assessed by chair stand performance over the 6-month intervention.

Results Feasibility of online resistance training was better than in-person for both studies (adherence: 86% vs 82% and 91% vs. 81% and retention 95% vs. 80% and 92% vs. 84% for online and in-person classes). Improvements in chair stand time were similar in prostate cancer and spouse groups that trained online vs. in-person, except for breast cancer survivors who improved more with in-person training (7% vs. 14% for online vs. in-person). Safety was similar between formats (12 vs. 11 adverse events for online vs. in-person).

Conclusion Supervised, in-person group resistance training can be feasibly adapted for live, online delivery and could help broaden approaches to exercise delivery in cancer survivors, including older adults.

Trial registration The studies described in this commentary were registered on ClinicalTrials.gov on August 3, 2018 (NCT03630354) and on October 30, 2018 (NCT03741335).

Keywords Cancer survivor · Exercise · Clinical trial · COVID-19

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Introduction

The American Society of Clinical Oncology, National Comprehensive Cancer Network, and American Cancer Society include exercise in survivorship care as a strategy to manage cancer-related side effects and improve quality of life for cancer survivors [1–3]. Revised guidelines from the American College of Sports Medicine include evidence-based exercise prescriptions for managing several cancer-related health outcomes, such as fatigue and physical functioning [4]. Despite consensus recommendations, the majority of cancer survivors remain inactive [5], indicating a major gap in disseminating and implementing recommendations into practice.

One potential barrier to exercise uptake is a lack of available programming and easy access to facility-based, supervised programs even when they do exist [6]. Home-based programs are a potential solution, but unsupervised exercise may not provide as potent of a stimulus as supervised group programs [4], and survivors may lack the motivation and confidence to exercise safely on their own [7]. This is particularly true for some forms of exercise, such as resistance training, which is vitally important for aging cancer survivors who are at risk for declines in musculoskeletal function [8, 9]. Due to the need for resistance equipment, such as machines or weights, and supervision for safety, the majority of resistance training is facility-bound.

We have shown that resistance training is acceptable, safe, and beneficial for cancer survivors when delivered in a supervised, group setting [10, 11]. Supervised group exercise also provides social support that can aid in compliance and retention [12, 13] and may also be an economical way to deliver exercise to many survivors at once. While efficacious, broad scalability of supervised group exercise programs is challenging. During the COVID-19 pandemic, we developed an approach to delivering supervised group resistance exercise to cancer survivors at home which we compare to our experience with previous facility-based training.

Methods

We are currently conducting two randomized controlled trials of supervised, group exercise training in cancer survivors, all of whom were previously inactive and who are mostly older (Table 1). One trial (Study 1: NCT03630354) that aims to determine the benefits of partnered exercise in couples coping with cancer includes breast cancer survivors plus their spouse who are randomized to either one of two twice-weekly supervised group resistance training arms (one arm has couples train as a team in a group with other couples, and the other arm has separate survivor-only or spouse-only groups) or to individual home-based resistance training [14]. The other trial (Study 2: NCT03741335) that aims to compare the efficacy of different exercise programs to prevent falls associated with androgen deprivation therapy includes men with prostate cancer randomized to thrice-weekly supervised group resistance, tai chi, or flexibility training [15]. The resistance training programs in both studies use functional, compound movements (i.e., squats, step-ups, multi-directional lunges, chest press, push-ups, planks). All classes were taught by certified fitness instructors, and group sizes ranged from 6 to 12 participants or couples per class.

Table 1 Participant characteristics, study compliance, preliminary efficacy, and safety between groups that participated in either in-person or live online exercise classes in two ongoing exercise trials impacted by COVID-19

	Study 1		Study 2			
	In-person		Live online		In-person	Live online
	Breast cancer survivors (<i>n</i> = 12)	Spouses (<i>n</i> = 12)	Breast cancer survivors (<i>n</i> = 19)	Spouses (<i>n</i> = 19)	Prostate cancer survivors (<i>n</i> = 21)*	Prostate cancer survivors (<i>n</i> = 11)
Demographics						
Age (years)	62.6 ± 8.9	66.2 ± 8.0	54.3 ± 11.3	54.2 ± 10.3	71.6 ± 6.4	71.8 ± 7.2
Comorbidities ^a	1.8 ± 1.2	1.1 ± 1.4	2.1 ± 2.0	0.5 ± 0.6	2.4 ± 2.6	3.4 ± 3.1
Feasibility						
Attendance (%)	81.1% ± 13.2%		86.2% ± 11.7%		80.6% ± 12.5%	91.1% ± 9.1%
Retention (%)	80.0%		95.0%		84.0%	91.7%
Preliminary efficacy						
Chair stand time (% change) ^b	-13.9% (22.9–0.0)	-10.7% (-13.2 to -6.9)	-7.1% (-11.9–1.2)	-9.1% (-16.1–9.3)	-23.7% (-31.4 to -14.7)	-20.0% (25.6 to -10.8)
Safety						
Adverse events (#) ^c	6	2	6	2	5	4

*Data from two groups of participants who trained in-person were combined

^aMeasured using the Charlson Comorbidity Index, a self-report measure of the presence and severity of chronic conditions, with higher scores indicating more comorbidity

^bData are presented as median and interquartile range % change pre-post 6-month intervention; negative values indicate improved chair stand performance and better lower extremity strength

^cTotal # of reported moderate adverse events related or possibly related to exercise training during the intervention period. No serious adverse events occurred in any group during the intervention

Both trials began enrolling participants for in-person exercise in 2019, and each had study groups exercising in-person at the beginning of March 2020. On March 13, 2020, the COVID-19 pandemic disrupted delivery of supervised, group in-person exercise interventions in both studies. We shifted delivery of all programs to video-conferencing and retained program elements of supervision and group training with live instruction to participants using a “conference call” style. Participants logged on to class 15 min before training for socializing. Training mode was preserved by sending free weights to participants’ homes, and the length of training remained the same. When these groups completed training, two new study groups were recruited into each trial, and these groups trained and tested online.

The forced shift in our delivery format from in-person to online presented us with an opportunity to explore feasibility of delivering supervised, group resistance training online and to describe adherence, retention, and adverse event reporting across 6 months between groups that participated completely in-person to groups participating completely in live, online training formats (i.e., excluding participants who trained both in-person and online during the initial shutdown). We could also begin to explore whether or not live online training yielded a similar training response to in-person training through measurement of pre-post lower body strength using a timed chair stand test (seconds to complete 5 chair stands) [16] administered in-person pre-pandemic and online during COVID-19 restrictions using our adapted protocol [17].

Results

Adherence, tracked by attendance to twice- (Study 1) or thrice- (Study 2) weekly exercise sessions, was 5–10% higher for live online classes compared to in-person classes, reaching rates of 86–91% over 6 months of training (Table 1). Similarly, retention rates over 6 months improved by 12%. Reasons for withdrawal were moved out of study area ($n = 1$), did not like group assignment ($n = 1$), poor health ($n = 6$), and no longer interested ($n = 3$). Improvements in chair stand time were nearly the same between prostate cancer survivors training online and men who trained in-person and exceeded the minimal clinically important difference (MCID) of 2.3 s for this test [18] (mean change and (SD): -3.29 (1.7) and -2.61 (2.2) s for in-person and online groups, respectively). A similar pattern occurred among spouses of breast cancer survivors. Breast cancer survivors training at a facility had improvements nearly twice that achieved online. None of the changes in Study 1 exceeded the MCID. The number of moderate adverse events related or possibly related to training was the same between formats.

Discussion

The unplanned shift in our delivery protocols due to COVID-19 restrictions was fortuitous in several ways. First, it provided us with a unique opportunity to learn how to retain the supervised and group elements of training that may be important components for optimizing training-related outcomes while transitioning to a virtual setting. Second, by comparing groups that participated in-person to those participating online, we now have preliminary data showing superior adherence and retention to a technology-dependent format among older cancer survivors—a group typically assumed to have limited internet and computer skills. Third, we showed that training fidelity and safety could be maintained with online supervised, group training at home, even in older adults. However, there was some indication that breast cancer survivors might benefit more from in-person training—an observation which deserves further exploration. Though stay-at-home orders during COVID-19 may have inadvertently contributed to better compliance to online sessions because people may have been motivated to stay connected to others and had fewer time conflicts for exercise, our observations provide a strong case that supervised group resistance training can be feasibly and safely delivered online to older adults with cancer.

The ability to reach into the homes of cancer survivors to deliver supervised and group-based exercise training can offer wide implementation advantages in terms of accessibility, safety, potential efficacy, retention, and social support. Untethering supervised group exercise from the need for adequate facilities and travel could mitigate some of the practical issues related to programing availability and accessibility and, therefore, enhance efforts to integrate evidence-based exercise medicine into standard oncology care. Our findings are particularly important when considering the success of online training in our cohort of older adults and challenges of accessing and scarcity of hospital-based or community-based exercise programs. The resources, logistics, and costs of delivering exercise online differ from facility-based training, and the tradeoffs of the two delivery approaches will need to be considered. There may be disadvantages to online training, such as exclusion of persons who may be too frail or otherwise unsafe to exercise alone in a home or persons with limited internet access, that are worth further consideration. The efficacy of training online compared to in-person also needs to be further established. Despite these unknowns, both the novelty and promise of delivering supervised group exercise online offer an unexplored opportunity to disseminating and implementing exercise medicine to cancer survivors.

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Author contribution KWS, KL, FL, and TMB contributed to the conception and design of the studies. Data preparation was performed by CB. The first draft of the manuscript was written by KWS and KLC, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data availability Not applicable.

Code availability Not applicable.

Declarations

Ethics approval OHSU Institutional Review Board approved the study protocols (eIRB #18000 and #18354).

Consent to participate All participants provided written informed consent to participate in the study prior to data collection and intervention.

Consent for publication N/A.

Conflict of interest The authors declare no competing interests.

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