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Enablers and barriers in delivery of a cancer exercise program: the Canadian experience

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ABSTRACT

Background Exercise is an important therapy to improve well-being after a cancer diagnosis. Accordingly, cancer-exercise programs have been developed to enhance clinical care; however, few programs exist in Canada. Expansion of cancer-exercise programming depends on an understanding of the process of program implementation, as well as enablers and barriers to program success. Gaining knowledge from current professionals in cancer-exercise programs could serve to facilitate the necessary understanding.

Methods Key personnel from Canadian cancer-exercise programs ($n = 14$) participated in semistructured interviews about program development and delivery.

Results Content analysis revealed 13 categories and 15 subcategories, which were grouped by three organizing domains: Program Implementation, Program Enablers, and Program Barriers.

- Program Implementation (5 categories, 8 subcategories) included Program Initiation (clinical care extension, research project expansion, program champion), Funding, Participant Intake (avenues of awareness, health and safety assessment), Active Programming (monitoring patient exercise progress, health care practitioner involvement, program composition), and Discharge and Follow-up Plan.
- Program Enablers (4 categories, 4 subcategories) included Patient Participation (personalized care, supportive network, personal control, awareness of benefits), Partnerships, Advocacy and Support, and Program Characteristics.
- Program Barriers (4 categories, 3 subcategories) included Lack of Funding, Lack of Physician Support, Deterrents to Participation (fear and shame, program location, competing interests), and Disease Progression and Treatment.

Conclusions Interview results provided insight into the development and delivery of cancer-exercise programs in Canada and could be used to guide future program development and expansion in Canada.

Key Words Exercise, survivorship, rehabilitation, qualitative analysis, program development

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INTRODUCTION

Cancer is the leading cause of death in Canada[1]. Advances in screening and treatment since the early 2000s have improved survival outcomes[1] and are contributing to a growing number of cancer survivors. Despite improvements in survival, many individuals live with acute and chronic adverse effects of cancer and associated therapies[2,3]. Adverse effects commonly include reductions in energy, physical fitness, sleep quality, appetite, and overall quality of life[4–7]. Exercise has been widely investigated as a strategy to mitigate the deterioration of overall well-being during cancer treatment and to facilitate recovery from the disease and its treatment-related sequelae[8]. Epidemiologic research also emphasizes an important role for exercise in the prevention of cancer and the reduction of cancer-related mortality[9–11].

Evidence of the widespread benefits of exercise across the cancer continuum has inspired the development of guidelines and training manuals for exercise screening, testing, and training[12–15]. Those resources are intended to guide a growing cohort of qualified exercise professionals in the safe and effective delivery of cancer-exercise (CEX) programs. As a result of the growing body of literature and CEX guidelines, CEX programs have become more prevalent.

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Consequently, research is beginning to explore specific aspects of program delivery. For example, investigation into the preferences of cancer survivors for particular CEX programming has identified several core features that cancer survivors consider favourable, including safety, effectiveness, convenience, and a "survivor friendly" environment[16–18]. Additionally, the literature suggests that strong emphasis should be placed on exercise adherence (peri- and post-program), which is required for maintenance of the exercise-related benefits[19,20]. Despite such investigations, little is known about the programming currently available in Canada.

Program coordinators have a unique and valuable perspective on the success and evolution of supportive and ancillary care programs for patients[21,22]. In many instances, program coordinators are clinicians with additional administrative roles wherein they manage the day-to-day activities related to program delivery. Those activities can include overseeing bookings and patient flow, clinical care, integration with other health care practitioners, and research agendas. Program coordinators often have frequent contact with program participants and other program staff; they consequently have an intimate understanding of the logistic challenges to program implementation and delivery. In particular, in the cardiac rehabilitation literature, the program coordinator's viewpoint has been valuable in elucidating patient-related barriers to participation in cardiac rehabilitation. For example, Fernandez and colleagues[21] reported that patients have difficulty coming to terms with diagnosis and disease, and experience challenges to making behaviour changes. Moreover, barriers to participation were identified, including cost and comorbidity[21]. For CEX programs, information gleaned from program coordinators could contribute to a deeper understanding of program implementation in this relatively nascent field.

To date, no formal guidance has been published about the implementation and sustainability of CEX programs in Canada. A qualitative examination of existing CEX programs, their experience with program development, and enablers and barriers to program delivery and sustainability will support the implementation of future CEX programs.

METHODS

Study Design

To gain insights into the development and current state of CEX programs in Canada, our qualitative study used inductive content analysis[23] of semistructured interviews with a cohort of CEX program coordinators. The study was approved by our institutional research ethics board, and all participants provided informed consent.

CEX Program Identification and Program Coordinator Recruitment

An Internet search and review of Canadian publications in exercise intervention research for cancer patients was used to identify CEX programs. Snowball sampling of interview participants was used in the event that study participants were aware of additional CEX programs. Program coordinators were eligible to participate in the interview if their program provided exercise counselling, prescription, or assessment to cancer patients during or after treatment (or both); had a clinical or research focus; were free or fee-for-use; and had medical supervision, referral, or consent. We excluded sole-proprietor and personal training services.

Program Coordinator Interview

The study team developed an interview schedule comprised of structured and semistructured questions. Structured questions explored each participant's demographic information and program infrastructure. The semistructured interview component used open-ended questions to investigate CEX program development, delivery, participation, strengths and weaknesses, and overall programmatic success. "Success" related to the capacity of the program for program delivery, the perceived benefit to participants, and sustained operation. The interviews were pilot-tested twice with the study team to finalize question wording and sequencing. Interviews were conducted by one research assistant (KB) trained in semistructured interviewing. Interviews lasted approximately 30 minutes, were digitally recorded, and were then transcribed for data entry and content analysis.

Quantitative Analysis

A descriptive analysis of the demographic and program information was conducted using the IBM SPSS Statistics software application (version 19.0: IBM, Armonk, NY, U.S.A.).

Qualitative Analysis

Inductive content analysis was used to identify categories that describe the landscape of CEX programs in Canada[23,24]. Investigators (DSM, KLC, KB, AGM) performed independent open coding of the initial 6 interview transcripts and then met to discuss and pursue agreement on codes and groupings. The same investigators then coded and grouped the remaining transcripts according to the initial transcript analyses, allowing for the addition of codes when appropriate. Upon completion of coding, the investigators met to identify categories and subcategories that were grounded in participant experience and could be used to classify central aspects of CEX programming.

RESULTS

The initial search identified 20 Canadian CEX programs. Recruitment e-mail messages were sent to the program coordinators between September 2011 and February 2012. Of the 20 coordinators approached, 14 provided consent to participate in the study. After completion of the interviews, it was determined that 2 participants represented the same CEX program and thus their interview data were combined.

Table I presents the characteristics of the program coordinators. Most were women, with a graduate degree in kinesiology, rehabilitation sciences, or exercise science, who had approximately 8 years' experience in their role. Table II presents the CEX program characteristics. Most were delivered in urban centres, consisted of a mix of home- and facility-based programming, and were conducting research. Programs were delivered in a variety of institutional settings (for example, hospitals, community centres, and universities) and were often funded by donations and

TABLE I Demographics of the program coordinators

Variable	Value
Sex (*n*)	
Women	11
Men	2
Education (*n*)	
Undergraduate	5
Graduate	8
Degree major (*n*)	
Kinesiology	4
Rehabilitation sciences[a]	3
Exercise science	4
Health research	1
Social work	1
Mean age (years)	42.6±11.2
Mean experience (years)	7.6±3.7

[a] Physical therapy, occupational therapy.

TABLE II Characteristics of the cancer exercise program

Variable	Value
Location of primary facility (*n*)	
Urban	12
Suburban	1
Location of program delivery (*n*)	
Home-based only	1
Facility-based only	1
Mixed (primarily home-based)	7
Mixed (primarily facility-based)	4
Institution type (*n*)	
Hospital	3
Community centre	3
Public fitness centre	1
Rehabilitation clinic	1
Community-based survivorship centre	2
Hospital and community centre	1
University	2
Funding source (*n*)	
Institution or internal	1
Research grants	2
Foundation (donation)	1
All of the above	3
Institution and foundation	1
Institution and research grant	3
Research grant and foundation	1
No funding (volunteer activity)	1
Conducting research (*n*)	
Yes	7
No	6
Delivery duration (years)	
Median	3
Range	1.5–15

research grants. The programs were generally quite new, at a median of 3 years of programmatic delivery.

Qualitative Profile of the CEX Programs

Content analysis revealed 13 categories and 15 subcategories, which were grouped into three organizing domains: Program Implementation, Program Enablers, and Program Barriers (Figure 1). Table III shows interview excerpts pertaining to each content category.

Program Implementation

> I think it was just commitment and dedication from the stakeholders of the program.... Great commitment from some of the oncologists, and fantastic financial commitment from the foundation via these oncologists ... very specific people who I think made the program what it is now. And you know that includes some of the exercise participants and volunteers—patient advocates of the program. —Participant 002

Program Implementation (5 categories, 8 subcategories) included Program Initiation (clinical care extension, research project expansion, program champion), Funding, Participant Intake (avenues of awareness, health and safety assessment), Active Programming [monitoring patient exercise progress, involvement of health care providers (HCPs), program composition], and Discharge and Follow-Up Plan.

Program Initiation was most often achieved in one of two ways: expansion of existing research protocols, or needs assessments for specific cancer populations. When programs were not initiated through those approaches, they were developed by extension of existing nonmedical clinical programs (for example, stress management programs). Successful program initiation was always accompanied by a dedicated individual champion who garnered support through physician and patient advocates.

The most common avenue of funding for CEX programming was funds raised through research-based projects, which ranged from small dedicated funds for pilot projects to large-scale research grants from national agencies. That funding provided the original capital equipment and secured facility space for the CEX program. Funding also came from individuals (for example, an interested HCP or patient) or groups who actively assisted with obtaining the financial resources necessary for program development and maintenance. Those supporters pursued funding from hospital or institutional foundations (or both) and by submitting research grant applications.

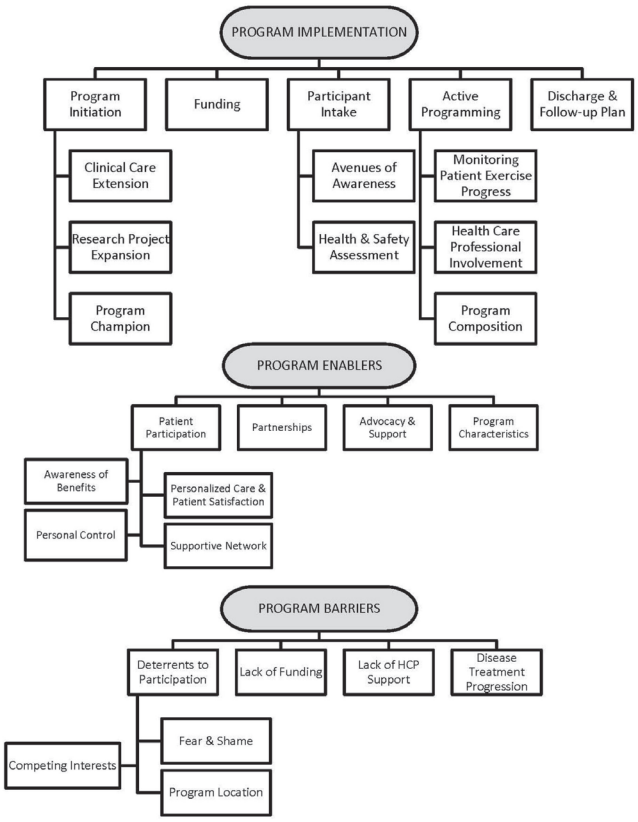

FIGURE 1 The three organizing domains, with their 13 categories and 15 subcategories, identified during analysis of the content from semistructured interviews with program coordinators about the development, delivery, participation, strengths and weaknesses, and overall programmatic success of cancer-exercise programs.

Participant Intake was facilitated through various avenues of awareness. Some CEX programs garnered interest by word-of-mouth, advertisements in hospitals or clinics, social media, or support-group meeting announcements that allowed participants to self-refer. Recruitment into the CEX program served as a point of entry into some research-based projects. Health care providers were seen to communicate the availability of CEX programs through presentations at clinical rounds or conferences that encouraged patient referrals to the program. In some cases, referral from a HCP (most often a physician) was required before an individual could participate in the program. After entry into the CEX program, an assessment or entry consultation was commonly conducted to screen for health and safety. Screening for safety or exercise prescription purposes could include any or all of aerobic and musculoskeletal fitness testing, cardiopulmonary assessment, anthropometric measurements, chart review, and psychological evaluation measures. Screening was conducted by exercise specialists, physicians, or psychosocial program facilitators. In some cases, the screening would dictate the exercise program into which the participant would enter, this serving as a triage strategy based on participant needs and interests.

Once a patient was enrolled, Active Programming included monitoring the patient's exercise progress, HCP involvement, and program composition. Programs implemented serial monitoring of outcomes to determine program efficacy and compliance with the exercise prescriptions. Outcome measures included changes in side-effect profiles (for example, fatigue), improvements in exercise performance outcomes (strength or endurance, for instance), and quality of life. Modifications to exercise prescriptions were made depending on progress from baseline assessments. The rigour and frequency of the assessments varied with the program. Some programs monitored on an "as-needed" basis; others implemented progress assessments at regular intervals (for example, every 2–3 months). Adherence was commonly measured using attendance to facility-based sessions and exercise logs or diaries to monitor home-based exercise. A number of programs also indicated that patient satisfaction was monitored by survey at the end of participation.

"Health care provider involvement" refers to the multidisciplinary staff of HCPs (physicians, exercise physiologists or fitness trainers, kinesiologists, physiotherapists, massage therapists, dieticians, psychologists, nurses, and researchers) who deliver CEX programs. Some programs trained graduate students and interns and utilized volunteers and administrative staff to support program delivery. Program composition varied substantially in CEX programs. All programs adhered to the general exercise recommendations for cancer survivors outlined by the American College of Sports Medicine[13], with some explicitly stating that they offered a "low-intensity" program.

In research-based programs, the interventions were specific to the ongoing research trials. Some facilities offered both clinical and research programming. Many CEX programs offered access to mixed-modality exercise (components of aerobic, resistance, and flexibility training), with some additionally offering alternative exercise programs including yoga and Pilates. Programs varied in length as well, with some offering fixed-duration programs (range: 6–48 weeks), and others offering program services to participants for as long as they wished. Several programs indicated that the exercise prescriptions were "individualized," based on the results of the baseline assessment.

Most of the programs that had a finite term for program participation incorporated a Discharge and Follow-Up Plan. Programs often included a standard discharge fitness assessment and, in some cases, a transition package designed to promote post-intervention home-based exercise engagement. Similarly, hospital- or university-based programs often referred participants to community-based survivorship programs.

Program Enablers

> They want to participate because they want to stay as healthy as possible.... They want to get their strength back, they want to reduce their fatigue, they want to build up their muscle mass and stamina and really stay as healthy as they can. And for people who have never exercised, it's often cancers that are a catalyst for changing to a healthier lifestyle.
> —Participant 008

TABLE III Examples of interview-derived (ID) quotes for domains and categories

Domain	Category	Subcategory	Quote
Program Implementation			
	Program Initiation	Clinical care extension	ID006: We were trying to help people that have lymphedema after breast surgery and wanting to ... have somewhere for them to go and do some exercise. So that's how it all started, and it just evolved really. We realized that ... it doesn't specifically have to be for somebody with just lymphedema only—that it really is a program that could be open to anybody that wants to start and [get] a level of fitness after their treatment, during chemo.
		Research project expansion	ID002: I think the key is to build it on a research platform if you're in an institution, I think the appeal of research is greater than the appeal of exercise. Even though I disagree with it, it's what is convincing institutions to adopt a program like this. I think they need to ... use standardized measures that are commonly used in the literature so that you can compare your findings to others.
		Program champion	ID007: [F]ind a sort of champion within the group of patients ... who continues to come and volunteer and promote the cohesion between the patients. Somebody that will organize after exercise get-to-gethers. I think identifying a champion is really important. ID002: From the program information implementation side, because you need to figure out a way to incorporate a novel survivorship program into our very financially strapped system, so you would need to figure out how you can get the funding to pay the bills without encroaching on critical and more favourable programs.
	Funding	(not applicable)	ID009: We tried different avenues to get [the program] to run, but that didn't happen until there was money.
	Participant Intake	Avenues of awareness	ID001: We put up posters at the cancer agency, [and] we send notices to local support groups for the breast cancer survivors, the dragon boat team ... as well as other agencies that work with cancer survivors.... There [are] other initiatives that are Web based ... and then word of mouth.
		Health and safety assessment	ID009: [W]e make sure that they have medical clearance before we do anything with them, and then they do about a half an hour to an hour—depends on medical review, in terms of going through the medical history—and they try [to] identify any other precautions and contraindications to exercising safely.
	Active Programming	Monitoring patient exercise progress	ID007: [W]e have patients fill in a diary both when they are at the centre and when they are at home. So it's a home based program, but the patients attend the centre once a week. So the patients fill in the duration of the type of exercise; aerobic or resistance training, duration of each exercise, heart rate at rest and immediate post exercise, and the total amount of time that it takes them, and any symptoms or comments that they may have will also go on the diary.
		HCP involvement	ID012: Cancer exercise specialty is really important for working with the side effects of cancer. It's not the same as working with any other ailment, so I think it's really important that ..., when they're implementing a program, they have a fair amount of experience working with cancer patients or have the resources to just to do so. I also think that they need to network themselves very well, creating awareness in the community and basically keeping their face within the events of the community.
		Program composition	ID004: In in some cases they come in and they receive a very basic program on how to get them through—you know—let's say it was women who had breast cancer and had lymph node involvement, had the surgery, and now have limited mobility in their arm. So they might come in just to get a few sessions on how to increase the mobility in their arm, and then that would be the end of it, we wouldn't see them again. The objective was met.
	Discharge and Follow-Up Plan	(not applicable)	ID009: At 12 weeks, the official research part ends, so that's ... kind of an official graduation date, where we stop doing the close monitoring but ... the reason why we chose the [YMCA] as a location for the exercise, is that it can accommodate a lot of people. So even though the official program ended, most of them don't leave.... They're there forever.
Program Enablers			
	Patient Participation	Personalized care	ID007: We create their initial exercise prescription and then they come into their first class, where they are provided with education about what the program is going to entail, and we give them a trial on what we think their exercise will consist of. And after that then we will create their specific program based on their capabilities and what their fitness assessment shows. ID010: [E]verything is individually tailored; they are given tailoring and adjusting throughout their program, but again, it depends on the program. Like yoga—they just go through the 12-week program, which is group-based, and there is no fitness testing—versus the program that we have right now for breast cancer, [where] they are continually re-evaluated throughout the 16-week program.

TABLE III Continued

Domain	Category	Subcategory	Quote
Program Enablers continued			
		Supportive network	ID006: [T]here's a lot of support. As soon as one new person is in the class, we have a few that will go introduce themselves and help them pick their weights out and everything, so there is a bit of that community spirit ... and it kind of makes it fun.
		Personal control	ID008: [T]hey want to participate, because they want to stay as healthy as possible.... Fatigue, they want to build up their muscle mass and stamina and really stay as healthy as they can. And for people who have never [exercised], its often cancer that is the catalyst for changing to a healthier lifestyle.
			ID014: [I]t enables an individual to gain a sense of fulfillment, feel better about themselves, reduce side effects from treatment.
		Awareness of benefits	ID003: They're starting to understand now that this is going to help them feel better and get through their treatment better, and then when they are done all that, they believe that this will help them prevent another cancer recurrence. So I think they're quite highly motivated to get through treatment well and stay well.
	Partnerships	(not applicable)	ID008: As we were sorting out how we might design this and put this together, an opportunity through the Canadian Partnership Against Cancer came about where we were invited to participate to be trained as facilitators for cancer transition.
			ID012: I also think that they (HCPs) need to network themselves very well, creating awareness in the community and basically keeping their face within the events of the community.
	Advocacy and Support	(not applicable)	ID005: Many of the oncologists have seen the success of the program, [and] they have become our greatest cheerleaders. They are really keen on this being available to all patients.
	Program Characteristics	(not applicable)	ID002: I think we have really good staff [who] really care about the patients and take the time to work with them. We don't rush them in and out, they come in, they spend time, we get what we need to get done. But I think we spend time, we care, we accommodate their need for interaction and communication.
			ID010: Great staff working [in the program], very knowledgeable. We train them very well so that they are providing a safe environment for the cancer survivors to work out in, and there is a fun element that we try to keep in there.
Program Barriers			
	Lack of Funding	(not applicable)	ID011: [W]e would love to run a community-based program where we could have the fitness centre and staff there a couple days a week like a cardiac rehab model. But we don't have any funding for that, so we receive funding for research projects. But to run community programs, we haven't found a good funding plan for that.
	Lack of Physician HCP Support	(not applicable)	ID011: [S]ometimes physicians are reluctant to refer their patients to exercise, but some of the recent research has sort of changed the tide of that. But I think education of clinicians is important.
	Deterrents to Participation	Fear and shame	ID008: There are people who are very comfortable in that fitness gym wellness environment and feel very comfortable going back to that.... There are others for whom ... a sense of shame or fear of the unknown judgment ... might be going on, so I think that's really important to keep in mind when you're designing a program. Otherwise, you are just going to design it for the people who probably would do it anyway.
		Program location	ID014: They can't make it here.... It's transportation or that type of thing.
		Competing interests	ID013: It's much easier when the patients are undergoing therapy, and they are still off work. But once they go back to their normal lives, it's much more difficult for them to make time for a structured program.
	Disease Progression and Treatment	(not applicable)	ID008: Their circumstances might change between when they sign up and when we start.... Sometimes they have just moved onto a different program, or they have had a reoccurrence.

Program Enablers (4 categories, 4 subcategories) included Patient Participation (personalized care, supportive network, personal control, awareness of benefits), Partnerships, Advocacy and Support, and Program Characteristics.

Patient Participation ("uptake") was aided by personalized care, a supportive network, personal control, and awareness of benefits. Personalizing the exercise program to the needs, strengths, and limitations of the participant was perceived to have a positive effect on patient participation and satisfaction. Establishing a supportive network of social connections between patients, HCPs, and peers also contributed to patient participation. Patients were seen to connect through a common goal of recovery and improved health that promoted a team atmosphere. Those relationships created a supportive network that provided both empathy and shared experiences with the other patients and the expertise and knowledge of the exercise instructor to address the physical and psychological needs of each participant. Access to HCPs outside the context of providing "medical" treatment (that is, focusing on health and wellness outcomes rather than oncologic outcomes) was also seen to be beneficial. Personal control over the cancer and treatment-related outcomes was described as a situational or individual trait that was the cornerstone of participation in the program by the patients. That control appeared to be a type of empowerment associated with exercising in spite of the adverse effects of the disease and its treatment. Awareness of exercise-related benefits added to uptake by the patients and was seen as an impetus for exercise behaviour.

"Partnerships" refers to the connection between CEX programs in large urban cancer centres, universities, and smaller community-based wellness centres. Where partnerships existed, CEX programs were able to provide ancillary care (for example, physiotherapy) and to increase long-term access to CEX programming. In some cases, partnering with national organizations having a common mandate (for example, the Canadian Partnership Against Cancer) was an objective for long-term program growth and development.

Advocacy for program development and maintenance was initiated by HCPs and patients alike. The CEX program development was often championed by an individual HCP and supported by patient advocates of the initiative. In some cases, those leaders played a role in conducting research into delivery strategies and communicating those strategies to local institutions to build momentum and support. Mentorship by program champions also supported program growth by training graduate students, postdoctoral fellows, and clinicians. General enthusiasm among oncologists and related disciplines helped to move CEX initiatives forward. Program champions were described as having such key characteristics as patience, resilience, and creativity. Patient advocates were current participants or "graduates" of CEX programs who wished to further support development or delivery of the program. Growth of the programs often came as a result of word-of-mouth communication between participants and participants sharing their satisfaction or experience with their health care team.

Program Characteristics that were favourable included programming that was flexible in nature and that provided participants with a physical environment conducive to adapted exercise. Programs that suited a variety of age groups and both sexes and that accounted for disease or treatment limitations were seen as beneficial to participants. The personalized care extended beyond the specifics of the exercise prescription; it also related to adapting program access for participants by offering extended working hours, transportation to and from the CEX program, free parking, and various modalities of exercise programming. Successful CEX programs offered a range of classes (group exercise, *qigong, tai chi,* yoga, Pilates) and were adaptable to participant needs or lifestyle. The social aspect and welcoming environment of many of the CEX programs was considered a key component of program success. It was important for patients to feel safe, supported, and welcome, and not to feel that they would be judged by instructors or other participants. Program success was attributed to choosing staff with cancer and exercise experience and professional credentials.

Program Barriers

> Doctors are very hesitant to refer patients who are undergoing chemotherapy and radiation.... [The] mixed message is that exercise is not necessarily the best thing for them, but research is obviously showing that that's not true; we are still experiencing ... difficulty in that sense.
> —Participant 007

Program Barriers (4 categories, 3 subcategories) included Lack of Funding, Lack of Physician Support, Deterrents to Participation (fear and shame, program location, competing interests), and Disease Progression and Treatment.

The lack of conventional funding sources (such as research grants, internal or institutional support, and private philanthropy) was described as the largest impediment to initiation and success of CEX programming. In some cases, research funding led to institutional support to further develop and provide CEX programming at the particular institution, but that situation was the exception. Difficulty with securing continued funding represents a significant barrier in CEX program sustainability in Canada.

Lack of Physician Support was identified as an important component of program initiation and success. Consequently, the absence of physician endorsement with respect to referrals, attention, and communication about the CEX program can impede program success. Program coordinators described the following physician-related barriers to success: lack of physician communication with CEX program coordinators, other allied HCPs, and patients about program availability; and a lack of referral of patients to CEX programs. The lack of physician support was attributed to physician disagreement with or unawareness of exercise-related benefits for cancer survivors and a reluctance to refer patients because of safety concerns. Program coordinators have suggested that providing education to physicians about the benefits of CEX programs is necessary to address this barrier.

Deterrents to Participation were factors that patients described to program coordinators as hindering their enrolment in CEX programs. Patient concerns included fear and shame, program location, and competing interests. Feeling safe and welcome was associated with program success, whereas shame and fear acted as a deterrent for patients engaging in CEX programs. Program location was often described as a barrier because of any or all of these factors: sited in an urban centre that was difficult to access; parking or fuel costs associated with travelling to the particular location; distance from home; and lack of transportation. Patients were described as often balancing many demands, priorities, or interests that ultimately interfered with their capacity to participate in CEX programs. Patients reported having "no time" to participate, specifically because they were already participating in other research trials; they were travelling during the time that the program was being offered; they had competing family commitments (particularly for women with breast cancer who had children); or they were participating in other cancer survivorship support programs.

Disease Progression and Treatment were barriers to exercise engagement. These concerns were attributed to the physical and psychological burdens associated with regressing health. Participants withdrew completely or temporarily because of any one or a combination of cancer-specific symptoms (especially severe fatigue) and related or unrelated comorbidities. In addition to the logistics challenges involved in coordinating treatment visits and exercise participation, treatment-related symptoms were also factors associated with decreased participation. Mortality also contributed to participant de-enrolment.

DISCUSSION

Several Canadian cancer organizations and institutions have broken ground in CEX programming by initiating clinical or research programs (or both) that provide clinical exercise-related care to patients. The programs provide a clinical service, often while they investigate the effects of exercise during the cancer experience. Our findings suggest that establishment of such programs has been arduous and continues to face numerous barriers to widespread implementation and acceptance. Program success appears to be intimately tied to physician and patient awareness of the benefits of exercise throughout the cancer experience. In this respect, the physician plays a critical role for the purposes of patient referral and recommendation to CEX programs; strategies to support and educate the physician about the benefits and availability of CEX programs are consequently justified. Research to further understand physician-related factors that affect referrals and recommendation for CEX programs, similar to those already investigated in cardiac rehabilitation[25], will guide strategies to support physicians and program administrators in facilitating enrolment. With the ever-growing body of empirical literature describing the benefits of CEX programming, coordinators could soon encounter less institutional and professional resistance and disinterest. Nevertheless, existing programs have been forged and maintained by a few resilient and dedicated individuals who continually overcome a variety of institutional, financial, and logistical hurdles to deliver even the most modest of CEX program models. In Table IV, we highlight some of the CEX programs available in Canada and the published literature about those programs, where available.

Previous studies have assessed patient preferences for CEX programming, providing initial insights and important feedback about the acceptability of, and interest in, exercise for cancer survivors[16,17,34–46]. Our findings suggest that many patient preferences for CEX programming are corroborated by the reports of program coordinators. For example, in earlier research, patients endorsed the need for flexible and adaptable programs, educational material about exercise as it relates to cancer, strategies to overcome transportation to the CEX program, qualified and professional staff with exercise training specific to oncology, and an environment conducive to social support[16,17,34–38,41–46]. In particular, congruent reports of the need to overcome transportation-related barriers (distance, time, and cost) from patients and program coordinators underscore the need to bridge the gap between the site of program delivery and more amenable locations for exercise (such as local community centres or home-based exercise programming). One potential approach could be electronic exercise instruction, communication, and monitoring after an initial face-to-face assessment. That type of approach, using electronic devices with Internet access, could reduce program delivery costs (less institutional overhead) and broaden patient contact to almost any region.

The most frequent limitation to the initiation and prolonged success of CEX programs is a lack of funding. Although CEX programs are not unique in having funding concerns, they remain underdeveloped in their capacity to overcome those concerns. To date, CEX services in oncology are not covered by public or private health insurance, because exercise is not yet considered a critical element of standard care for cancer patients or survivors. In this respect, the field of cardiac rehabilitation is more mature and has garnered the support of clinicians and health policymakers to ensure that cardiac patients have access to the requisite rehabilitation programming. Studies examining the cost-effectiveness and various delivery approaches of CEX programming will undoubtedly advance the field toward inclusion into the realm of publicly and privately funded health care, resulting in improved opportunities for financial support for such programs.

Our study has several novel aspects and strengths. First, the present report is, to our knowledge, the first to consider CEX program development in Canada. It marks an important step in documenting the history of this field and its transition from primarily research programming to systemic clinical application. More practically, our content analysis provides the first experience-based support framework for initiating new CEX programs. In addition, the identification of several Canadian CEX programs highlights the need for improved communication between those programs. Communication is important to enhance collaborative relationships, to maximize health care and

TABLE IV Cancer exercise programs in Canada

Province	Program	Reference
British Columbia	Inspire Health http://www.inspirehealth.ca	—
Alberta	Thrive Centre http://www.ucalgary.ca/healthandwellnesslab/programs/thrive-centre	—
Manitoba	Cancer Management Exercise Program	—
Ontario	Wellness and Exercise for Cancer Survivors (WE-Can), formerly the Survivorship Exercise Program http://www.ellicsr.ca/en/clinics_programs/we_can	Santa Mina *et al.*, 2012[26]
	Wellspring Cancer Exercise Program http://www.wellspring.ca	—
	Canwell http://www.canwellprogram.ca	Cheifetz *et al.*, 2014[27], Cheifetz *et al.*, 2015[28]
	UW WELL-FIT http://www.uwaterloo.ca/uw-fitness/uw-well-fit	Noble *et al.*, 2012[29]
	Ottawa Regional Cancer Centre Rehabilitation Program	Segal *et al.*, 1999[30]
	Palliative Rehabilitation Program https://www.ottawahospital.on.ca/wps/portal/Base/TheHospital/ClinicalServices/DeptPgrmCS/Programs/CancerProgram/AboutTheCancerProgram/OurProgramsClinics/SupportiveAndPalliativeCare/PalliativeRehabilitationProgram/	Chasen *et al.*, 2013[31]
Quebec	McGill Cancer Nutrition–Rehabilitation Program https://www.mcgill.ca/cnr/cancer-nutrition-rehabilitation-program	Chasen and Dippenaar 2008[32], Parmar *et al.*, 2013[33]

research funding, to motivate information-sharing across the discipline, and to establish mentorship for programs in development. Our reporting on the perspectives of program coordinators also complements prior qualitative research into patient preferences and highlights shared concerns about personalization and sensitivity of care[43]. Finally, our response rate was high (70%), and our Canada-wide sample included sites in British Columbia ($n = 1$), Alberta ($n = 3$), Manitoba ($n = 4$), Ontario ($n = 9$), and Quebec ($n = 3$).

Our paper must be considered in light of several limitations. First, our sample is limited to Canadian institutions, and given the relative scarcity of CEX programs, we did not randomly sample them. Our approach to recruitment (using publication and Web searches) might have resulted in some programs being missed, especially those that were not publicly advertised or that did not produce research. However, given the nascent status of the field, we suspect that our sample is generally reflective of the current state of the discipline. In addition, many of our findings related to patient experiences in the program (participation, attrition, and satisfaction, for instance) must be considered to be hearsay; they might not necessarily reflect the opinions that patients would offer directly. Furthermore, social desirability could have influenced the description of each program coordinator's home program, highlighting the positive attributes of the program while minimizing the challenges, barriers, and deficiencies. However, we generally found that program coordinators were generous in their discussions of the obstacles to programmatic success, likely as a means to improve program success through formal documentation.

CONCLUSIONS

Program coordinators provided insights about CEX program initiation and success. Many limitations in delivery appear to be funding-related, but CEX program initiatives have striven to provide adaptable and specialized exercise prescriptions for cancer survivors, while accommodating disease- and treatment-related barriers to participation. Our findings provide insight and guidance to clinicians, administrators, and researchers involved in implementation and refinement of CEX programs. Future research that monitors program development and the potential discontinuation of current programs will ensure that the insights related to CEX enablers and barriers remain contemporary.

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CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology*'s policy on disclosing conflicts of interest, and we declare that we have none.

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