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Exploring cancer centres for physical activity and sedentary behaviour support for breast cancer survivors

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ABSTRACT

Background   Up to 90% of breast cancer survivors report low levels of physical activity (PA) and spend approximately 70% of the day in sedentary behaviour. Survivors might not be receiving information about the health benefits of PA and the consequences of sedentary behaviour in the context of their cancer. The primary purpose of the present study was to evaluate cancer centres for PA and sedentary behaviour information and infrastructure. A secondary aim was to evaluate the quality of the information that is accessible to breast cancer survivors in cancer centres.

Methods   A built-environment scan of the 14 regional cancer centres in Ontario and an evaluation of the text materials about PA available at the cancer centres were completed. Data analyses included descriptive statistics, proportions, and inter-rater reliability.

Results   The infrastructure of the cancer centres provided few opportunities for dissemination of information related to PA through signs and printed notices. Televisions were present in all waiting rooms, which could provide a unique opportunity for dissemination of information about PA and sedentary behaviour. Text materials were rated as trustworthy, used some behaviour change techniques (for example, information about the consequences of lack of PA, barrier identification, and setting graded tasks), and were aesthetically pleasing.

Conclusions   These findings represent areas for knowledge dissemination both for the centre and for resources that could be further improved.

Key Words   Breast cancer, physical activity, sedentary behaviour, environmental scans, text materials

INTRODUCTION

Breast cancer (BCa) is the most common cancer diagnosis in Canadian women[1], leading to a large and growing population of BCa survivors (defined from the time of diagnosis until end of life[2]). Improvement in physical activity (PA) and reduction in sedentary behaviour both have health and survival benefits for BCa survivors[3-5], but upward of 90% of survivors are not active enough to gain health benefits[3,6,7]. Furthermore, BCa survivors spend upward of 70% of their day engaged in sedentary behaviours[8] (defined as waking behaviour spent in lying, reclining, sitting, or standing with no movement, regardless of energy expenditure[9]). Importantly, the combination of increased sedentary behaviour and physical inactivity is a unique health risk that is common among cancer survivors[4,10]. Thus, efforts are needed to help BCa survivors increase their PA and decrease their levels of sedentary behaviour[3,6].

Cancer-specific PA guidelines[11,12], evidence-based recommendations[5], and a sedentary behaviour agenda[10] have been developed. Together, low rates of PA and high rates of sedentary behaviour create an apparent knowledge-to-action gap[13,14]. Researchers in PA have focused primarily on scientific discovery rather than on dissemination of scientific findings to survivors[13] or on improving opportunities for increasing PA and reducing sedentary behaviour[3,13]. Cancer centres have opportunities to enable PA and reduce sedentary behaviour (for example, education classes for

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patients, PA programming) and to provide resources for BCa survivors to take home (for example, advertisements and contact information for reliable PA and cancer groups in the community, and print resources), but the availability of those opportunities and resources has not been studied.

It is important to examine the availability and quality of PA and sedentary behaviour information for BCa survivors. Specifically, trustworthiness of information is important, and information providers (for example, cancer care agencies) can adhere to quality assurance criteria[15] when developing and disseminating information[16]. Relevant indicators of information quality include transparent reporting about the purpose of a document, funding sources, and responsible partnering[16]. Other important details include readability[17], aesthetics, and the format of the provided information[18]. Information about adherence to quality standards (for example, transparent reporting) and details about the readability and aesthetics of materials can be thus used to evaluate the trustworthiness of the information provided to BCa survivors.

Information about PA and sedentary behaviour should also be evidence-based and should integrate strategies that are critical to successful adoption and maintenance of PA[16]. Those strategies—the Coventry, Aberdeen and London–Revised (CALO-RE) taxonomy of behaviour change techniques—are the "active ingredients" that can be used to change behaviour[19]. Some examples of behaviour change techniques used in PA interventions for BCa survivors include goal-setting[20], action planning[21], and barrier identification[22]. The extent to which PA resources offer evidence-based techniques for initiating and maintaining a more active lifestyle is currently understudied. In addition, understanding the environment, including the availability of supportive programs and existing PA infrastructure within cancer centres, can also aid in identifying barriers and potential facilitators and inform the development of appropriate PA programs[13].

An environmental scan is a common strategy used in school-based health behaviour evaluations[23,24] and could be applied to assess the availability and quality of resources in cancer centres. For instance, in school-based environmental scans, questionnaires measure the prevalence of PA programs and policies, the built-in PA programming (that is, programming available on-site compared with in the community), and the availability of equipment or resources that enable PA[23]. Those methods could be easily adapted for use in cancer centres to identify available PA-related resources. Thus, the primary purpose of the present study was to conduct an environmental scan of cancer centres for information and for infrastructure relating to PA and sedentary behaviour.

Although the cancer centre environment might not be specific to BCa, the text materials available at the centres are often cancer-site-specific. The focus of the present study was BCa, and thus a secondary aim was to evaluate the quality of the information that is accessible to BCa survivors in cancer centres. It was hypothesized that cancer centres would have scant information about PA and provide few opportunities for PA. It was also hypothesized that few materials would be gathered and that the quality of those materials would be rated fair.

METHODS

Sample and Procedures

For the environmental scan, a purposive sample of 14 regional cancer centres in Ontario was used. Ontario cancer centres treat approximately 38.5% of BCa survivors in Canada[1]. Within Ontario, 14 regional cancer programs are responsible for cancer treatment and care. Each regional program consists of a network of hospitals, including 1 regional cancer centre and its partner hospitals. Regional cancer centres were identified using the Web site of Cancer Care Ontario, which is the governing organization for cancer-related care (https://www.cancercareontario.ca/en/find-cancer-services/regional-cancer-centres/list).

After research ethics board approval (no. 31848) and identification of the sample of cancer centres, a built-environment evaluation scan that drew on school-based health evaluations[25,26] and neighbourhood scans for PA opportunities[27,28] was developed. A built-environment scan is an objective review of the environmental factors that influence an organization; those factors can include programs, policies, and physical features (for example, the availability of visible, safe, and clean stairs for walking) within an organization[29,30]. Specifically, two raters (AJF and a research assistant) rated 12 of the centres, and one rater (AJF) coded the remaining 2 centres. Ratings were completed during a walkthrough of the breast clinic waiting room ($n = 1$) or the cancer centre waiting room ($n = 13$) and a scan of the patient resource library and any information or bulletin boards. As part of the assessment, raters collected all printed materials related to PA and sedentary behaviour, including flyers, posters, handouts, and information posted in the cancer centres. Photographs were taken when the material was not collectable.

Measurement Tools

Evaluation of the Cancer Centre Environment
A built-environment checklist was developed based on tools previously used to audit school settings for PA resources[26,28]. The 43 items on the checklist were rated as present or absent (1 or 0). When appropriate, items were also rated on quality, ranging from excellent (5 = facility, equipment, and signage are clean, safe, or clear), to good (2–4 = facility, equipment, and signage are somewhat clean, safe, or clear), to poor (1 = facility, equipment, and signage are not at all clean, safe, or clear). Quality was also rated with an open-ended question ("Please describe why you've rated the overall aesthetic of the waiting room/exercise facility/signage as such"). The quantity of items was also assessed on a scale of 0–2 [0 = none, 1 = some (1–10), 2 = many (≥11)]. The environmental scan checklist was reviewed by expert team members (JMJ, GF, CMS) and pilot-tested with two independent raters (AJF and a research assistant) at a Toronto-based centre. The Toronto-based centre was included in the final sample.

Text Material Evaluation
A rating tool was developed to assess the quality of PA and sedentary behaviour resources available to survivors from the cancer centres. That tool had been used in an

earlier study examining Web-based resources about PA for cancer survivors[16].

Based on previous evaluations of health-related information on the Internet for people with a spinal cord injury[31] and the quality of health-related Web sites[15], 85 items were used to evaluate text materials and were scored as either present or absent (1 or 0). Two independent raters evaluated each resource, and disagreement was resolved with discussion. Items were included to rate transparency and disclosure (for example, is the person or organization responsible for the document clearly identified?), authority (for example, does the resource state where the information came from?), frequency with which information is updated (for example, date of revisions), accountability (for example, is there a statement ensuring responsible partnerships with reputable organizations?), and accessibility, including whether the information is easily understood, clearly presented, and appropriate for the target audience (for example, readability).

Additionally, the evaluation tool used behaviour change items drawn from the CALO-RE taxonomy of behaviour change techniques[19]. The CALO-RE taxonomy (40 behaviour change techniques) has previously been assessed in a study examining the validity of mobile device applications for PA behaviour change[32]. Behaviour change information was deemed important because those common strategies are important for initiating and sustaining PA.

The rating tool was pilot-tested with two independent raters who were trained research assistants, one of whom was not involved in the environmental scan. The pilot test was conducted with two selected booklets that were found in at least half the cancer centres. Those booklets were included in the final analysis.

Data Analysis

Descriptive statistics are presented as means with standard deviations or proportions. The kappa coefficient was used to assess inter-rater agreement for the environmental scan and text material evaluation. Specifically, kappa coefficients were calculated by comparing the observed agreement and the probability of chance agreement for each cancer centre or text item. Statistics were calculated using the IBM SPSS Statistics software application (version 24: IBM, Armonk, NY, U.S.A.).

RESULTS

Evaluation of the Cancer Centre Environment

The environmental scan of each cancer centre was completed in a median of 20.8 ± 8.4 minutes (range: 8–35 minutes). Of the 43 items on the checklist, only 15 items (for example, quantity and quality of chairs in the waiting room, televisions, notices about off-site PA classes or courses) were relevant to most of the cancer centres (93%). The remaining items (for example, free weights, yoga or exercise mats, mirrored wall, empty floor space for exercise) pertained to on-site exercise facilities, of which there was only one in Ontario.

Table I reports the scores for the built-environment scans. All of the waiting rooms (100%) had televisions, computers, or tablets available. Many people (>10) were often present in the waiting rooms, and enough chairs were available for those present. A few centres (*n* = 6) had posters about cancer and PA, which were rated as fair (2 out of 5). In 5 cancer centres, notices about off-site (that is, community-based) PA programs were available. Only one exercise facility specifically for cancer survivors was available within a cancer centre, and one cancer centre had a gym that paying members could access. The kappa for inter-rater reliability was 0.96.

Evaluation of Text Materials

Of 86 relevant materials collected from 15 cancer centres, 25.8% were specific to BCa. A mean of 6.1 ± 3.0 documents (range: 2–11 documents) were collected per centre. After removal of duplicates, 58 unique materials were evaluated (24 pamphlets, 21 booklets, 8 flyers, 5 newsletters).

Based on proportions, unique documents were rated as trustworthy because they were transparent about the provider responsible for developing the document (98%), the purpose of the document (98%), the target audience (97%), the date of publication (55%), and the organizations associated with the document [for example, cancer-related charities, research groups (55%)]. Materials were generally rated as easy to read (98%), aesthetically pleasing (90%), and easy to use (97%). The collected materials did not include any general information about sedentary behaviour, any tools or tips to decrease time spent in sedentary behaviour, or any sedentary behaviour references.

The materials included some behaviour-change techniques from the CALO-RE taxonomy, such as provision of information about the consequences of lack of PA in general (39%), barrier identification or problem-solving (29%), and provision of information about consequences of lack of PA to the individual (24%). Unused techniques included shaping, facilitating social comparison, fear arousal, self-talk, imagery, stress management or emotional control training, motivational interviewing, and general communication skills training. Table II presents details of the text material review, and Table III summarizes the behaviour change techniques. The kappa for inter-rater reliability was 0.86.

DISCUSSION

The primary purpose of the present study was to evaluate cancer centres for PA and sedentary behaviour information and infrastructure. A secondary aim was to evaluate the quality of the information that is accessible to BCa survivors in cancer centres. The main cancer centres in Ontario had pleasing waiting areas with televisions. Printed materials related to PA and BCa survivorship were readily available and accessible. Printed materials that were collected and reviewed were found to be trustworthy and used some behaviour change techniques[19]. Materials collected did not contain any information on sedentary behaviour.

Evaluation of the Cancer Centre Environment

Ontario cancer centres generally lack infrastructure devoted to PA programming for BCa survivors. No realistic opportunities for increasing PA are therefore available within the clinics or centres themselves. Nonetheless, the

TABLE I Environmental scan of 14 regional cancer centres in Ontario

Built-environment item[a]	Centres with the item		Mean quality score
	Proportion	**Number**	
Waiting room			
1. One or more televisions in waiting room	1.00	14	
2. Computer or tablet in waiting room	1.00	14	
3. People in waiting room	0.79	11	
4. Chairs in waiting room	1.00	14	
Signs			
5. Sign for an exercise facility	0.07	1	
6. Signs about physical activity	0.43	6	
7. Quality of signs about physical activity	—	—	2.2±1.3
8. Notice of on-site exercise class	0.21	3	
9. Overall quality of notices for on-site exercise class	—	—	2.0±0.7
Bulletins and printed notices			
10. Notice of off-site exercise class	0.36	5	
11. Overall quality of notices for off-site exercise class	—	—	3.3±0.5
12. Posters about research trials related to physical activity and cancer survivors	0.14	2	
13. Quality of the research trial posters	—	—	4.0±1.2
14. Posters about general health behaviours	0.57	8	
15. Brochures or pamphlets about physical activity	0.79	11	
16. Exercise facility present at cancer centre	0.07	1	

a   Number rows represent environmental checklist items. No signs for exercise facility rules were found.

centres generally had similar, favourable waiting room designs that could be used for PA promotion[33]. General practitioners in France use their waiting rooms to disseminate health-related information; however, they do not use a defined dissemination strategy (which might be needed to improve effectiveness)[33]. Gignon and colleagues[33] suggested that, to reinforce health messages, patients be prompted with materials found in the waiting room in coordination with physician advice. In the context of the present study, passive dissemination of PA and sedentary behaviour information on the televisions in the waiting rooms might be valuable. The effectiveness of a relatively passive PA and sedentary behaviour dissemination strategy has yet to been tested and is a future area of research.

Opportunities also exist within the current infrastructure to augment networks of referral to current cancer and PA support programs (for example, Wellspring, YMCA Encore). A new referral pathway has been proposed[34] in which cancer survivors are "triaged" by their oncologists to appropriate PA resources, including educational materials, online programs, supervised hospital-based programs, and community-based programs for either cancer survivors or the general population. Future research is encouraged to test implementation of that pathway for engagement of BCa survivors with PA and resource use within the Ontario cancer care system.

Evaluation of Text Materials

Text materials found in the centres were rated as trustworthy. However, dates of revision, funding sources, credentials of information providers, trustworthy partnering, and editorial policy statements were not present in many of the materials, suggesting that further transparency and disclosure are warranted[15]. It is important that, as with Web-based PA information, the text information provided to BCa survivors be up to date[16]. Breast cancer survivors perceive barriers related to accurate PA strategies, and that perception can play a role in PA engagement[35,36].

Providing information about the consequences of lack of PA in general was the most common behaviour change technique present (39%), which is similar to loss-framed messaging. From a theoretical perspective, behaviours that serve a preventive purpose (that is, PA) are perceived as less risky than detection behaviours (for example, participation in mammography) and, to be persuasive, are better presented as gain-framed messages[37]. Consistent with that approach, a meta-analytic review (ninety-four studies) found that gain-framed messages are more effective than loss-framed messages for preventive behaviours[38]. Although that analysis might suggest that gain-framed messages are inherently advantageous, it is important to consider the context of the message. Many of the studies included in the systematic review were conducted with apparently healthy individuals[38]. But when the context switches to cancer survivors, or individuals who are not apparently healthy, the effect of framed messaging is not as clear[39]. An examination of the effectiveness of loss-framed compared with gain-framed messaging about PA for BCa survivors is needed.

TABLE II   Textual material evaluation of 58 documents

Characteristic	Materials with the characteristic	
	Number	**Proportion**
Transparency and trustworthiness		
Provider responsible for document	57	0.98
Purpose or objective	57	0.98
Readability	57	0.98
Usability	56	0.97
Target audience defined	47	0.81
Date of publication	32	0.55
Affiliation (patient or community organization)	32	0.55
Service provision	28	0.49
Funding sources stated	18	0.31
Trustworthy partnering	18	0.31
Credentials of information providers	8	0.14
Editorial policy statement	7	0.12
Date of revisions	5	0.08
Exercise Information		
Links or contact information to resources in community	37	0.64
Exercise or physical activity information offered	33	0.57
Inclusion of general physical activity guidelines	4	0.07
Theory-based information	2	0.03
Offered in more than one language	1	0.02
Overall aesthetics of document and images		
Font size (legible)	57	0.98
General look (pleasing)	52	0.90

Barrier identification or problem-solving was the second most commonly identified behaviour change technique (29%). Many of the collected documents included specific barriers for BCa survivors such as lymphedema, cancer-related fatigue, and pain. In a qualitative study, BCa survivors suggested unique barriers related to cancer, including fatigue, pain, and lack of social support[36]. Brunet and colleagues[40] suggested that researchers should develop strategies that reduce cancer-specific and common barriers experienced by BCa survivors. It is important that those barriers and problem-solving strategies be addressed in this population, because not addressing them could be a missed opportunity to increase task self-efficacy (that is, engagement in PA[41,42]) and barrier self-efficacy.

Despite an increasing body of literature and the research agenda put forth by Lynch and colleagues[10] to examine the effects of prolonged sedentary behaviour in cancer survivors, none of the collected text materials contained general information about sedentary behaviour or the related health consequences for BCa survivors. Given the increase in sedentary behaviour interventions in other populations, consensus definitions and frameworks have been developed to better understand such behaviour[9]. Including such information in materials currently provided to survivors is therefore important[10]. For example, BCa survivors who completed an online questionnaire acknowledged that prolonged sedentary behaviour is harmful to their health; however, they required more information to ameliorate the behaviour[43]. Because the materials gathered from the cancer centres were rated as trustworthy (that is, transparent in reporting the provider responsible for developing the document, the purpose of the document, the target audience, the date of publication, and the organizations associated with the document) and because survivors have unmet information needs related to PA[44], text materials could be a potential avenue for further educating BCa survivors. Future research is encouraged to develop materials with integrated information about the health effects of PA and the consequences of sedentary behaviour for BCa survivorship and to test those materials for acceptability to survivors.

Limitations

The built-environment scan offers a general overview of the built environment in Ontario cancer centres. Those facilities likely had the most funding, given that they are the main cancer centre in each region. Scans were completed only in Ontario and are not generalizable to the rest of Canada.

TABLE III Behaviour change techniques found in the textual material evaluation of 58 documents

Technique from the CALO-RE taxonomy of behaviour change techniques	Material with the technique	
	Number	Proportion
Provide information about consequences of lack of physical activity in general	23	0.39
Barrier identification or problem-solving	17	0.29
Provide information about consequences of lack of physical activity to the individual	14	0.24
Set graded tasks	13	0.22
Relapse planning and coping	12	0.21
Provide normative information about behaviour of others	11	0.19
Provide information about where and when to perform the behaviour	11	0.19
Action planning	7	0.12
Goal setting	6	0.10
Provide instruction on how to perform the behaviour	5	0.08
Teach to use prompts or cues	5	0.08
Plan social support or social change	5	0.08
Model or demonstrate the behaviour	4	0.07
Environmental restructuring	4	0.07
Prompt self-monitoring of behaviour	3	0.05
Prompt rewards contingent on effort or progress towards behaviour	2	0.03
Provide rewards contingent on successful behaviour	2	0.03
Prompt generalization of a target behaviour	2	0.03
Behavioural contract	2	0.03
Prompt self-monitoring of behavioural outcomes	1	0.02
Prompting focus on past behavioural outcomes	1	0.02
Provide feedback on performance	1	0.02
Prompt practice	1	0.02
Use of follow-up prompts	1	0.02
Prompt identification as a role model	1	0.02
Prompt anticipated regret	1	0.02
Time management	1	0.02
Stimulate anticipation of future rewards	1	0.02

CALO-RE = Coventry, Aberdeen and London–Revised.

The evaluation of text material was conducted only for materials that were freely available and likely does not reflect all materials given to survivors. The evaluation of the text materials used behaviour change techniques from the CALO-RE statement[19]; however, other methods for characterizing behaviour change, such as the Behaviour Change Technique Taxonomy (version 1) with its 93 techniques[45] and the Behaviour Change Wheel[46], are available. It is likely that using another characterization method would yield different and perhaps more telling results. For instance, the present evaluation might have missed behaviour change techniques outlined in the updated 2013 CALO-RE taxonomy. Further, the Behaviour Change Wheel identifies sources of behaviour and intervention functions that might be useful for survivors who want to understand how to become more active[46]. Additionally, using a set taxonomy to identify behaviour change tools might not have allowed unique tools not found within the taxonomy to be identified.

Although data about notices of offsite or community-based PA programs within cancer centres were collected, the quality of those programs is not known. Future research is encouraged to conduct an environmental scan of community-based PA programs for cancer survivors to determine the number that are available and any indicators of quality. Finally, the PA levels of BCa survivors within each centre could not be simultaneously examined, and as a result, no determination could be made about whether the PA levels of survivors are associated with information availability, an analysis that might have shed light on such associations.

CONCLUSIONS

Breast cancer survivors in Ontario can gain PA support from the information found in the environment of cancer centres. Developing and testing text materials that provide

information about evidence-supported behaviour-change techniques and sedentary behaviour might facilitate increased pa and decreased sedentary behaviour in this population. Additionally, identifying appropriate dissemination pathways will facilitate outreach to as many bca survivors as possible.

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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