Original Article

The qualitative impact of the rural exercise for cancer patients and survivor programme (RECaPS)

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Abstract

Introduction: Structured exercise is increasingly reported to be a viable form of adjunct psychological care for cancer patients and survivors, but its availability in rural centres is scarce. Rural cancer survivors face significant psychosocial strain due to limited resources, programming and mental health support. Meta-reviews highlight the physiological and psychosocial benefits of exercise but often overlook hard-to-reach populations. This emphasizes the need for a more integrative, scalable approach to rural health and survivor diversity, a gap this study aims to address. Exercise should be promoted as an accessible form of care for this population. Our study assesses the qualitative outcomes of a rural community-based exercise programme for cancer patients.

Methods: This descriptive, mixed-methods study evaluates the implementation and impact of a Rural Exercise for Cancer Survivors and Patient. RECaPS is a 12-week, personalised exercise programme aimed at promoting accessibility to specialised-exercise support services to rural, community-based cancer patients and survivors. The programme incorporated both qualitative insights and fitness assessments to assess physical outcomes and participant experiences.

Results: Structured, personalised exercise programming fostered a cohesive environment where participants felt safe and supported in a flexible model that allowed them to improve their physical health despite individual barriers. Where participants may have felt powerless about their cancer diagnosis, RECaPS programming and support enabled them to regain control over their physical recovery.

Conclusion: The importance of individualised programming and competent, compassionate care cannot be overstated in the literature of exercise oncology. Structured, yet flexible programming is highly valued by participants across the cancer care continuum. RECaPS programming was effective for all participants to begin rebuilding their physical capacity in a safe, supportive environment.

Keywords: RECaPS, rural cancer patients, rural exercise programme

Résumé

L'impact qualitatif du programme Rural Exercise for Cancer Patients and Survivors (RECaPS)

Introduction: L'exercice structuré est de plus en plus reconnu comme une forme viable de soutien psychologique complémentaire pour les personnes atteintes

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d'un cancer et les survivants du cancer. Toutefois, ce type de programme demeure peu accessible dans les milieux ruraux. Les survivants du cancer vivant en région rurale font face à une pression psychosociale importante, notamment en raison du manque de ressources, de programmes et de soutien en santé mentale. Les méta-revues soulignent les bienfaits physiologiques et psychosociaux de l'exercice, mais tiennent souvent peu compte des populations plus difficiles à rejoindre. Cela met en évidence la nécessité d'une approche plus intégrée, adaptable et sensible à la diversité des survivants en santé rurale — un vide que cette étude cherche à combler. L'exercice devrait être encouragé comme une forme de soins accessible pour cette population. Notre étude évalue les retombées qualitatives d'un programme d'exercice communautaire en milieu rural destiné aux personnes atteintes d'un cancer.

Méthodes: Cette étude descriptive à devis mixte évalue la mise en œuvre et les retombées du programme Rural Exercise for Cancer Survivors and Patients (RECaPS). RECaPS est un programme d'exercice personnalisé de 12 semaines visant à améliorer l'accès à des services spécialisés de soutien par l'exercice pour les personnes atteintes d'un cancer et les survivants du cancer vivant en milieu rural et suivis dans leur communauté. Le programme combinait des données qualitatives et des évaluations de la condition physique afin d'examiner à la fois les résultats physiques et l'expérience des participants.

Résultats: Un programme d'exercice structuré et personnalisé a permis de créer un environnement cohésif où les participants se sentaient en sécurité et soutenus, dans un modèle flexible leur permettant d'améliorer leur santé physique malgré leurs obstacles personnels. Alors que plusieurs participants pouvaient se sentir impuissants face à leur diagnostic de cancer, le programme RECaPS et l'accompagnement offert leur ont permis de reprendre un certain contrôle sur leur rétablissement physique.

Conclusion: Dans le domaine de l'exercice en oncologie, l'importance d'un programme individualisé et de soins compétents, humains et empreints de compassion ne saurait être surestimée. Les participants, à toutes les étapes du continuum de soins en cancer, accordent une grande valeur à des programmes à la fois structurés et flexibles. Le programme RECaPS s'est révélé efficace pour permettre à l'ensemble des participants d'amorcer la reconstruction de leurs capacités physiques dans un environnement sécuritaire et soutenant.

Mots-clés: personnes atteintes d'un cancer, programme pour survivants du cancer, RECaPS, exercice

INTRODUCTION

Rurality is a socioenvironmental determinant of health. Rural cancer survivors experience higher mortality and poorer health outcomes than their urban counterparts.[1-3] Rural areas are classified as having low population density situated outside of major population centres.[4] Rural residents face multi-level barriers across the cancer care continuum, from treatment to survivorship.[5,6] This places a disproportionate strain on the limited rural healthcare resources, due to a geographically dispersed and ageing population.[7] Although oncological advances have improved survival outcomes, they bring extended psychosocial and logistical challenges, stressing the need for a more holistic and integrated model of care that prioritises quality of life.[8,9] Undergoing cancer treatment increases the risk of additional comorbidities and cancer-specific mortality due to direct, multisystem toxicities and indirect functional sequelae.[10-12] This promotes a wide range of chronic conditions, including physiological challenges such as cardiometabolic dysfunction, psychological conditions such as anxiety, and multifactorial sequelae such as cancer-related fatigue.[13-15] Most indirect comorbidities share modifiable risk factors, such as inactivity. If left untreated, they can lead to reduced quality of life and functional limitations such as neurocognitive impairment, disabilities or neuropathy.[12,13,16]

Exercise is an adjunct therapy that can reduce the risk of recurrence, cancer-specific mortality and related functional impairments.[17-19] Evidence consistently demonstrates that exercise improves quality of life across cancer populations and treatment contexts.[19] Rural cancer survivors have reduced exercise uptake due to systematic barriers such as low programme visibility, geographic inaccessibility and lack of cancer-specific programming.[20,21] Exercise acts on multiple physiological pathways by improving treatment tolerability and cardiometabolic markers, while attenuating treatment-related muscle loss and associated health risks.[18,19,22] While the direct effects on cancer are still being explored, pre-clinical evidence suggests it may enhance

tumour oxygenation, modulate tumour metabolism and support early anti-tumour mechanisms.[23] These enhanced defence mechanisms can boost responses to anti-cancer treatments, improve surgical outcomes and minimise post-operative complications and symptoms.[19,24,25]

It is well established that physical activity also supports psychological well-being and provides holistic benefits from improved energy to sleep quality.[26-29] Exercise acts through complex biological processes such as neurotransmitter regulation (e.g., serotonin), growth factor enhancement (e.g., brain-derived neurotrophic factor) and regulation of the hypothalamic–pituitary–adrenal axis.[30,31] These mechanisms improve cognition, reduce inflammation and mitigate the stress response.[26-28,32] Exercise also acts through several psychosocial mechanisms such as components of self-determination (e.g., mastery and control), social support and self-efficacy (e.g., belief in one's capabilities), thereby improving adherence by restoring a survivor's sense of physical capacity.[33-38] In the case of cancer survivors, supervised, personalised interventions show greater adherence and stronger outcomes due to the instilled sense of normality, growth in physical confidence and connection with fellow survivors.[26,33,34,39] Exercise programming is especially important for rural survivors, who face significant psychosocial strain due to limited access to mental health services.[40] Therefore, exercise should be promoted as an accessible form of care for this population.

Despite growing evidence in support of exercise as an adjuvant therapy, key research gaps remain in the effective analysis of its implementation and outcomes on rural populations, as most studies are urban-based and not easily adaptable to rural settings.[41-43] This only furthers the need for a more integrative, scalable approach to rural health and survivor diversity – a gap our study aims to address.

Since the focus of our study lies in understanding how rural cancer survivors engage with specialised exercise intervention, a qualitative approach is appropriate for capturing levels of engagement, attendance and psychosocial outcomes. The purpose of our study is to assess the outcomes of a rural, community-based exercise programme for cancer patients and survivors, with the aim of improving access to specialised support services for underserved rural populations across Northern Ontario.

METHODS

Our study is a descriptive, mixed-methods study evaluating the implementation and impact of a Rural Exercise for Cancer Survivors and Patients (RECaPS) programme in Muskoka. Muskoka, Ontario, is a regional municipality of approximately 65,000 residents having more than 3000 new cancer diagnoses annually, which exceeds the provincial average.[7,43] In addition, Muskoka has an aging population; 28.3% are 65 years or older compared to 18.3% in all of Ontario.[44-47] All exercise regimens and testing took place at a local gym and training facility in Huntsville and Bracebridge, Ontario. RECaPS is a 12-week, personalised exercise daytime programme aimed at promoting accessibility to specialised-exercise support services to rural, community-based cancer patients and survivors. This manuscript reports on the results of the qualitative component of the broader mixed-methods evaluation, focusing on participant experiences of the RECaPS programme. Quantitative outcomes from physical assessments and standardised questionnaires are available through the corresponding author (manuscript under review).

Participants consisted of adult cancer survivors, or those currently undergoing treatment, residing in rural Ontario, specifically in the region of North Simcoe Muskoka (Towns of Huntsville and Bracebridge). Eligibility criteria included a previous (within 5 years of programme start-date), or current, cancer diagnosis, informed consent and physician clearance for participation for programme enrolment. Participants were assigned a unique study ID to protect confidentiality.

Recruitment methods included hospital-based mailouts, poster placements within the waiting rooms of the Muskoka Algonquin Healthcare's chemotherapy clinic and local doctors' offices, local media support and word of mouth. Participants from related communities were also invited to participate with appropriate medical clearance. Physician clearance was required before screening with support from primary care physicians (PCP) and colleagues. Most referrals came from PCPs (58%), with none refusing their patients' requests.

Pre-testing before RECaPS

Participants completed a set of standardised, baseline surveys and physical assessments, the quantitative aspect of our study. Information on lifestyle behaviours (e.g., smoking status), dietary intake and general health status were collected, along with baseline health metrics (e.g., blood pressure). Lasting approximately 1 h, patients participated in semi-structured interviews with the research assistant (MP), informing about their goals and expectations for their participation in the programme. Data collected also included demographics, information related to their cancer treatments, previous exercise experience and barriers to exercise, with open-ended questions for each section, allowing personal feedback. Completion of the Senior's Fitness Test (including Chair Stand and Arm Curl) and Grip Strength protocol (using standardised dynamometry procedures) was also administered to record any negative events or participant commentary.[48,49] These pre-programme assessments allowed modifications for individual programming, where indicated, because of medical complexity. At baseline, aerobic fitness was estimated using a modified Naughton protocol (treadmill exercise stress test). In this study, a progressive, ramp cardiopulmonary exercise test, validated in cancer patients[18] to maximal or submaximal thresholds according to individual capacity and medical clearance (*Protocol available upon request)*. Treadmill speed and grade were incrementally increased each minute until maximal or submaximal exertion, with incline recorded at test termination. Aerobic fitness was quantified using maximum heart rate, total test duration and peak Rate of Perceived Exertion Scale (RPE) (0–10 scale), recorded every 3 min. For submaximal tests, heart rate at 85% of predicted HRmax was recorded.

Exercise intervention

Over the course of the study, 12 cohorts were offered. Each cohort was structured to include 10–15 participants, lasting a total of 12 weeks. Individuals took part in 1 cohort, which included twice-weekly, 60-min sessions over the course of 12 weeks, totalling 24 sessions. Each session consisted of both resistance and aerobic training and was personalised based on the pre-test results. Attendance, modifications, exercise adherence and adverse events were recorded in the participants' logs. A master Excel Sheet was used to code and produce specific high-intensity interval training and moderate-intensity continuous training sessions. The resistance training portion of the exercise session consisted of a full-body weightlifting workout. Each session included 8 exercises, each targeting a different area of the body (e.g., seated row and chest press). Many alternatives were used for each exercise, including using free weights, resistance bands, body weight or alternative machines when necessary. At the end of each session, the exercise lead (DL) reviewed and recorded any adverse events. DL filled out the prescriptions for the next session, adjusting the weights as needed.

Post-testing after RECaPS

The post-test process was identical to pre-testing. Qualitative data included a second semi-structured interview using the baseline questionnaire to record patient outcomes after their experience. Pre- and post-quantitative data were collected after the 12-week programme. Each participant attended a one-on-one session with the Exercise Lead and the research team to complete the final fitness testing.

Data analysis

Qualitative data derived from pre- and post-intervention interviews and open-ended survey responses were analysed using Braun and Clarke's (2006) 6-step thematic analysis.[42] 2 authors (FS) and (AB) independently analysed participants response's using NVivo software to inductively identify codes and collaboratively developed a codebook. Responses were then analysed by 1 author (LA) using the developed codes to finalise themes. Authors performing coding communicated as needed during final coding to discuss any new codes that emerged. Saturation of data was ensured during the coding process. Deidentified findings were checked with participants to confirm credibility.

This study was approved by the Laurentian University Research Ethics Board file 6013841 and is compliant with the Declaration of Helsinki.

RESULTS

One hundred and 4 participants took part in the study. One individual was excluded due to medical limitations (multiple metastases), although their PCP supported inclusion. The Coronavirus disease 2019 (COVID-19) pandemic had a significant effect on accessibility to in-person programming throughout the world as compliant gyms were closed. As a result, class sizes were reduced from 10 to 12-5 participants; however, the last cohort expanded to 9. However, it is important to note that even with the 18-month study interruption, <20 participants were unable to complete the programme. Reasons for discontinuing were the COVID-19 pandemic and increased scheduling complexities related to personal matters.

Theme 1: Benefits of community-based support

Across participant accounts of the RECaPS programme, a strong sense of community emerged as a key theme, highlighting the unique value of a group of peers sharing similar biopsychosocial challenges. As 1 participant stated:

'Many of us carry with us a sense of PTSD and this program brings us together and helps us understand we are not alone in our struggles'.

This image evokes the weighted, ongoing burden cancer survivors carry at each stage of their journey. The programme helped in bridging the gap between isolation and a shared sense of humanity, helping participants realise that cancer is a universal experience that many share. This cultivated adherence, as the programme was described as 'energetic' and 'motivational' by participants. The leaders were also described by participants as being crucial in fostering a positive, socially cohesive environment through guiding and promoting their emotional and physical safety.

Theme 2: Individualised programming and coaching

Cancer causes very heterogeneous and complex side effects, along with altered physical capacities that require more specialised attention. The ability to create customised exercise plans for RECaPS' participants made this programme more accessible and rewarding to many people. Despite differing physical abilities, participants in the programme were able to progress at a safe and manageable pace because of the guidance and modifications instituted by the exercise leader. Participants found that this flexible model allowed them to improve their physical health despite individual barriers.

'My RECaPS experience was highly valued and I particularly found the coaching and supervision crucial to helping me manage and overcome long-term cancer treatment side effects that had previously limited my ability to exercise'.

Many participants have commented that their experience was enhanced by the customised exercise programme (e.g., adjustments and accommodations) that met their individual needs. Overall, this programme succeeded in increasing or maintaining the physical abilities of participants.

Theme 3: Enhancing health and strength

This programme succeeded in increasing or maintaining the physical abilities of participants. Many participants commented on noticeable improvements in both their strength and cardiovascular capacity following their participation in those components of the programme.

'I was very nervous about the treadmill part but was very pleased that I went from 10 min to 40 min by the end. I now look forward to doing the treadmill now that I found a speed that is a groove for my hips. I am challenging myself with some sprints and incline'.

This programme has helped individuals gain confidence in exercise and achieve manageable goals through the individualised, adaptable and educational plans. Many participants were motivated to continue exercising outside of the programme as they were more physically capable and knowledgeable about increasing activity in a safe manner while managing treatment-related side effects.

Theme 4: Embodiment and reclaiming the body

Notably, cancer therapies and the illness itself can drain a survivor's physical vitality, leading to a sense of disembodiment and alienation from one's own body. Exercise has the power to counteract this by encouraging a sense of

embodiment, a feeling of presence and control over oneself.

'I can honestly say I feel the best I have felt in 5 years'.

This statement effectively captures the long and taxing journey faced by participants and how exercise can promote a form of pre-cancer vitality through physical re-engagement.

'I gained so much from this experience – I gained mobility, strength, and well-being'.

This quote highlights how physical embodiment is a multi-faceted process and a key benefit of exercise for cancer patients beyond conventional physical health measures.

Theme 5: Education and empowerment

Cancer can be marked by a sense of powerlessness. Being educated on how to manage one's own physical capacity was empowering for participants, helping them regain control over their physical recovery. Confidence and engagement come from physical competence and knowledge, which participants gained through education on machine use, proper form and how to understand heart rate readings.

'As a cancer survivor trying to get back into a fit lifestyle, I struggled with fatigue and weakness. I would try to exercise more but as soon as I felt fatigue I would stop; I now check my heart rate and feel more confident pushing through a workout to the desired exertion level. Game changer!'

Participants learned how to push themselves in a safe and structured way, which changed how they approached their lifestyle. Equipped with knowledge and appropriate enthusiasm, participants felt more proactive, confident and better able to measure and manage their own gains.

Theme 6: Positive experience

Many RECaPS participants commented on how excellent the programme was for them and the positive experiences they had. Multiple participants said the programme was well-structured, with the combination of cardiovascular and strength exercises enhancing their experience. Often, descriptors such as '*positive impact*', '*motivational*' and '*exceptional*' were used to describe the programme.

Participants also recognised the benefits of this programme for cancer patients:

'RECaPS is an exceptional program that should be available to everyone at any time during their diagnosis and recovery'.

Overall, this programme has made a positive impact on many lives and has left participants eager to continue exercising, due to its holistic design.

Theme 7: Barriers and limitations

Although RECaPS has many positive components, participants have experienced barriers as well. Barriers for individuals include a lack of attendance due to work, difficulty travelling to the gym from far distances and the inability to participate due to the onset of injuries. As some participants were in recovery during the programme, cancer treatments and their side effects also became a barrier for certain participants.

'The program was great, with the only limitation on my part, due to my health journey with treatments and surgery during the same period'.

DISCUSSION

This qualitative study examined participant experiences in a structured, rural-community-based exercise program (RECaPS) that took place over a 12-week span. While expanding on current exercise-oncology literature, this study aimed to bring forth valuable insights on rural survivors and factors promoting their adherence, physical rehabilitation and psychosocial well-being.

In our study, participants attending the RECaPS exercise programme experienced a positive improvement in their psychological and physical condition. One of the defining psychosocial benefits of the programme for rural residents was the sense of community support. Participants felt the programme extended beyond physical rehabilitation, evolving into a socially supportive structure centred around skill-building. Previous studies have similarly shown how the exercise programme was not just an 'individual phenomenon' or 'subjective experience' but one of social involvement and group positivism.[35,48] Cancer carries its own complex, emotional toll, often fueling isolation and functional limitations, which are particularly acute for rural survivors. Social communities built around physical autonomy help bridge this gap. In Luoma *et al.*'s

work, breast cancer survivors described shared exercise as fostering acceptance and empathy, described as 'being in the same boat'. Chemo Club participants observed that peer support helped reduce pressure on family members, highlighting the value of community-based programming beyond individual participants.[31,46] Psychosocial services and cancer-specific programming are especially limited in rural settings compared to that of urban centres; therefore programmes that foster community around a shared sense of recovery are vital for these subpopulations.[21,40,42]

Individual programming and instruction

The importance of individualised programming and competent, compassionate care cannot be overstated in the literature of exercise oncology. Structured, yet flexible programming is highly valued by participants across the cancer care continuum.[48] This facilitates the rebuilding of physical capacity in a safe and informative way. RECaPS participants found the supportive instruction, along with relevant modifications, crucial in facilitating their physical and individual needs. As noted in 2 studies, knowledgeable instructors were informative and reassuring towards participants by helping them set clear, manageable expectations.[48,49] In separate studies, participants reported feeling no need to explain reduced capacity, which minimised shame and a sense of inferiority post-treatment.[35,37] Across literature, instructors were characterised as 'encouraging', 'comforting' and attentive to individual needs, overlapping with RECaPS findings that instructor support was a major motivator.[50,51] Overall, cancer-specific, individualised instruction affirmed participants' needs and fostered a sense of safety and recognition beyond generic interventions, which is in alignment with RECaPS participant feedback.[51,52]

Multiple RECaPS participants described tangible improvements in their fitness, whether through improved treadmill endurance or increasing progressive loading. These findings coincide with existing qualitative literature on oncology exercise interventions, which reported a range of physical benefits such as improving functional capacity and energy levels.[38,51-53] Similar quantitative studies demonstrate that significant physiological gains followed structured exercise for cancer patients.[54,55] Exercise also helped in mitigating health-related side effects while reducing fatigue and pain management – similar to the benefits reported by RECaPS participants.[29,55] These physical milestones, big or small, improve self-efficacy by motivating participants and help in creating positive associations, bodily autonomy and seeing themselves as strong rather than vulnerable.[50] Furthermore, these personal improvements in health are sources of confidence and allow a re-engagement with lifestyle activities before cancer.[50]

Alongside physiological gains, RECaPS participants detailed a more layered process of reintegration with their bodies, conceptualised as embodiment. Previous studies have communicated similar embodiment processes, as exercise encourages an affirming connection with post-treatment bodies, helping survivors rebuild and redefine their physical identity.[53,55] In 1 study, on breast cancer survivors who underwent a programme similar to RECaPS, they discussed entering into a space where the effects of treatment on their appearance, such as scarring and alopecia, was normalised and less of a worry, allowing them to reconnect and experience their bodies beyond the fear of social scrutiny.[54] In addition, it mentions how instructors, again, were encouragijng, helping them evolve from 'patients' to 'healthy women' suggesting a similar pattern of re-embodiment.[48] These positive outcomes could be especially impactful in rural contexts, with limited reach to rehabilitative care, furthering the need for supportive, flexible programmes like RECaPS for recovering lost function and agency through a holistic integration of wellbeing.

As previously discussed, the post-treatment period of survivorship is marked by a reduction in bodily confidence, which was addressed in the RECaPS guided, instructor-led programme, valuing safe and effective physical activity. The skill-building process combined with supportive instruction encouraged autonomy, more specifically in learning proper machine use, interpreting heart rate data and how to challenge oneself cautiously. As shared by RECaPS participants, confidence in acquiring these skills builds more sustainable empowerment through comprehension as opposed to simple performance, allowing them to make informed choices while exercising. This is highly valuable, especially

for rural participants, if access to exercise isn't always available, allowing them to confidently access exercise where formal programming may not always be an option. RECaPS programming enables participants to carry these skills into their daily lives.

These findings overlap with the broader literature, on how structured, supportive exercise restores a sense of empowerment by reducing fear. Physical activity also helped transition survivors from an illness mindset to one of wellness, offering a respite whilst empowering survivors.[29,31,48] This relates to previous observations on how post-treatment exercise can be a form of identity transformation from a passive to an active agent in one's recovery.[37] One study noted that the attentive and thoughtful approach by instructors encouraged them to feel safe and empowered to test their physical boundaries, and transition from passive victim to active involvement in their health.[51]

Having a positive experience in exercise programming often emerges from the integration of physiological, psychological and social processes rather than from a single source alone. RECaPS participants described the programme as positive, noting how group and instructor dynamics encouraged an affirming environment by boosting morale whilst reducing isolation, a finding reported in other qualitative studies.[35,38] One study noted how experiencing personal positive changes was highly motivational and closely associated with perceptions of positivity around their illness.[54] In addition, positive experiences were attributed to how physical activity was seen as helpful for their cancer recovery, reflecting a shift in how exercise is understood and valued during diagnosis and treatment.[54] This overlaps with RECaPS participants' perceptions of positivity, as RECaPS was described as being meaningful across different stages of illness and recovery, stressing the importance of its availability. Taken together, these findings suggest that positive exercise experiences may play an important role in promoting motivation and supporting adherence.[22,51]

In spite of the positive outcomes, participants did face barriers throughout the programming, including long travel distances, work conflicts, injuries and treatment-related side effects. Although transportation obstacles were noted by a minority of participants, these observations align closely with existing literature on rural survivorship, underscoring the importance of developing programmes with these rural challenges in mind.[41-43]

Limitations

Programme delivery during daytime hours likely made it more difficult for individuals who were employed, which may have influenced enrolment capacity. As a result, the participant sample was predominantly older adults with a mean age of 65.5 years. While this may be related to greater schedule flexibility among retired individuals, this age group also represents a high proportion of the local community. In addition, the sample size included significant geographic dispersal and the small population of these rural communities, limiting the findings within a specific rural context.

CONCLUSION

This study contributes to the growing body of evidence on community-based, individualised exercise programmes, which could significantly enhance the quality of life of rural cancer survivors. By centring the experiences of survivors, RECaPS showcases how supportive programming that is individualised, adaptive and flexible engages in a dual process of psychological and physiological recovery. This enhances their psychosocial well-being, self-efficacy, physical confidence and recovery. Future research should be geared towards focussing on adapting and scaling similar models to create rural equity across dispersed survivor populations, notably in rural Ontario.

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