

Factors influencing non-participation in an exercise program and attitudes towards physical activity amongst cancer survivors

Sarah J. Hardcastle¹ · Chloe Maxwell-Smith¹ · Sviatlana Kamarova¹ ·
Stephanie Lamb² · Lesley Millar² · Paul A. Cohen^{3,4,5}

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Abstract

Purpose The purposes of this study are to investigate factors influencing non-participation in a structured exercise program for cancer survivors and to explore survivors' experiences and attitudes in relation to physical activity participation.

Methods Face-to-face or telephone interviews were conducted with individuals who had registered for, or engaged in, the 'Life Now' exercise program run by Cancer Council Western Australia. Participants were 20 cancer survivors (mean age 63.90 years, SD 15.29) who had either cancelled their registration or withdrawn from the exercise program during the preceding 2 years. Interview transcripts were analysed using thematic analysis.

Results Seven main themes emerged: *availability of the program; access, time and cost; lack of motivation or confidence; unwell or fatigued; physical activity preferences;*

knowledge of physical activity guidelines; and lack of referral or advice. The main barriers were contextual and included availability of, and access to, the program. Participants expressed a preference for home-based physical activity.

Conclusions Interventions aimed at promoting physical activity in cancer survivors should offer home-based programs and include referral and advice from oncologists.

Implications for cancer survivors Increasing cancer survivors' participation in, and compliance with, exercise programs may require home-based strategies and referrals from oncologists to allied health professionals to individualise care.

Keywords Cancer survivors · Exercise program · Oncology · Psychology · Motivation · Psychosocial · Behaviour change

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✉ Sarah J. Hardcastle
sarah.hardcastle@curtin.edu.au

¹ Health Psychology and Behavioural Medicine Research Group, School of Psychology, Curtin University, Perth, Australia

² Cancer Council Western Australia, Bagot Road, Subiaco, Perth, Australia

³ Bendat Family Comprehensive Cancer Centre, St John of God Hospital, Subiaco, Perth, Australia

⁴ Division of Women's and Infants' Health, School of Medicine, University of Western Australia, Crawley, Western Australia, Australia

⁵ Institute for Health Research, University of Notre Dame Australia, Fremantle, Western Australia, Australia

Physical activity (PA) attenuates many of the adverse effects of cancer and its treatment, including fatigue and psychological distress [1, 2]. Recent evidence suggests that physical activity during or following treatment reduces the risks of cancer recurrence and cardiovascular disease (CVD) [3, 4]. Compared to the general population, survivors are at increased risk of secondary cancers, CVD and functional decline [5] which share common risk factors [6].

Insufficient PA, low fruit and vegetable intake, smoking and alcohol consumption increase susceptibility to cancer, CVD and other chronic diseases [6]. Increased PA may promote cancer survivors' health, well-being and longevity [6]. Accordingly, there has been an increase in the development of exercise programs for cancer survivors [7]. The guidelines for PA are to accumulate at least 150 min of moderate-intensity PA per week [7]. However, between 50 and 70% of cancer survivors fail to meet these recommendations [8, 9].

Despite an increase in exercise programs specifically tailored to cancer survivors, little is known about how such

programs are perceived and the barriers to participation. Research has focused on health benefits, quality of life (QoL) and reduction of fatigue [10] but few studies have explored the experiences of survivors attending such programs and barriers to participation amongst those who cancel their registration or drop out.

Barriers to PA participation include lack of time or motivation [11–17] and cancer-specific barriers concerning benefits and safety [13, 18, 19]. Psychological barriers such as dislike of gyms and ‘not being the sporty type’ have also been observed [16, 17, 20]. Survivors report that they were either ‘too busy’, had ‘no willpower’ or displayed a ‘lack of interest’ to engage in PA [12–14, 17, 20, 21].

Additionally, social and environmental factors including bad weather, responsibilities at home and lack of access to facilities and an exercise partner have been identified as significant barriers to PA [12, 15–17, 20]. Unsurprisingly, health concerns have emerged as a barrier to increased activity in cancer survivors [12–14]. Physical barriers to activity include pain, fatigue, ageing and weight gain [16, 17, 20]. There is a paucity of data regarding barriers to formal exercise programs for cancer survivors.

Many cancer survivors do not adhere to an active lifestyle and reasons for this are poorly understood. Understanding key influences on PA participation is necessary to inform interventions designed to increase PA in this population.

The objective of the present study was to investigate factors influencing non-participation to an exercise program for cancer survivors. Secondary aims were to investigate survivors’ recollections regarding the content of lifestyle advice received following cessation of treatment and knowledge of PA guidelines and to explore the types of intervention participants would find most helpful to become more physically active.

Methods

The current study conformed to COREQ guidelines for qualitative research by Tong et al. [22].

Participant recruitment

Following Human Research Ethics Committee approval (Curtin University Reference: HRE2016-0139), an assistant employed at Cancer Council Western Australia (CCWA) ascertained participants from records of cancellations and those that did not attend or dropped out of the exercise program during the previous 2 years. Dropout was defined as attendance of $\leq 50\%$ of exercise sessions. The assistant contacted participants via telephone or email to determine whether they met inclusion criteria, provide information about the study and ask whether they were willing to participate.

Inclusion criteria were > 18 and < 90 years of age, diagnosed with cancer in the previous 5 years, either completed or undergoing cancer treatment, proficient in English and had either dropped out of the exercise program, cancelled registration or failed to participate.

One hundred fifty-three patients met the inclusion criteria and were invited to participate. Patients registered their interest via email or telephone and subsequently received a telephone call from a researcher to arrange a convenient time to conduct an interview. Written informed consent and permission for the interviews to be audio-recorded was provided. They were informed that pseudonyms would be used in reporting of data to protect their identity.

The exercise program

The ‘Life Now’ exercise program run by CCWA, a state-based not-for-profit cancer organisation, runs for 12 weeks, for an hour class twice weekly and is facilitated by an accredited exercise physiologist with additional training in the needs of people affected by cancer (for an overview of the program, view www.cancerwa.asn.au/patients/support-and-services/life-now/). Participants must obtain medical clearance prior to participation. The program is free and designed to reduce fatigue, improve physical function, manage weight and improve QoL. Uptake of the program has been low with a high proportion of patients either cancelling registration or failing to attend. During 2014–2015, 44% of people cancelled their registration and 12% failed to attend (Personal communication, CCWA).

Data collection

Semi-structured interviews lasting up to 60 min were conducted by SH, CMS and SK. SH (PhD) has expertise and a wealth of experience in qualitative data collection and analysis. CMS and SK were PhD students with previous interviewing experience. Interviews took place at the participant’s home. An interview guide was used with questions concerning experiences with the exercise program and reasons for dropout or non-attendance. Participants were asked about the influences on, and barriers to, PA in addition to their knowledge of the PA guidelines. Participants were also asked whether they recalled receiving advice about PA from their oncologist or had been referred to the exercise program by their oncologist.

The interview guide based on previous research [21, 23] is shown in [Appendix A](#) (as online supplemental materials). Interviews were digitally recorded and transcribed verbatim. Data collection ceased at the point when no new information was gained and data saturation was reached [24].

Data analysis

Data were analysed independently by two researchers (SH and CMS) using thematic analysis [25]. The purpose of this was to maximise interpretations through reflections on, and exploration of, alternative interpretations of the data. Thematic analysis involved several steps. The first step involved *immersion* and involved carefully reading transcripts several times to identify participants' meanings. The second step involved attaching codes to salient text segments. The third step involved the identification of themes at a broader level and examining whether codes could be combined to form an overarching theme. During these processes, inductive analysis was used to identify themes that emerge directly from the data. The final step involved both researchers meeting to discuss and compare themes, to cross-check for overlap and differences and finally defining and classifying themes. The analysis offered is one interpretation of the interviewees' experiences and we acknowledge that other interpretations are possible. Nevertheless, we aim to offer a credible and trustworthy interpretation that captures participants' perceptions and experiences. For example, we provide 'thick description' via the use of extensive and direct quotations so that the reader can evaluate the interpretation [26].

Results

Twenty survivors, out of 153 invited, participated in the study. The majority were female (70%, $n = 14$). The mean age was 63.90 ± 15.29 . Participants were enrolled in programs across 8 locations in the Perth metropolitan ($n = 7$) and inner regional areas ($n = 1$). Four locations ($n = 8$ participants) were in socially deprived areas according to socio-economic indexes for areas (SIEFA) categorization (Australian Bureau of Statistics, 2013). Response bias analyses indicated that there were no significant differences in the age ($t(143) = 1.49, p = .15$) or gender ($\chi^2(1) = 0.02, p = .99$) of participants who participated ($N = 20$) compared to those who declined ($N = 133$). Participants' ($n = 85$) reasons for declining study involvement include lack of time or unavailability ($n = 12$), lack of interest ($n = 8$) and illness ($n = 2$). Many potential participants could not be reached by phone ($n = 34$). Participant characteristics are summarised in Table 1.

Analysis of the data identified seven main themes: *availability of the program; access, time and cost; lack of motivation or confidence; unwell or fatigued; physical activity preferences; knowledge of physical activity guidelines; and lack of referral or advice.*

Table 1 Participant characteristics

Age (years)	
Mean	63.90
SD	15.29
Range	22–87
Location of exercise program	
Perth Metropolitan area	16
Inner regional area	4
Categorization of non-participation	
Cancelled registration	9
Failed to attend	5
Dropped out of program	6
Type of cancer	
Breast	9
Brain	2
Colorectal	2
Melanoma	1
Prostate	1
Tongue	1
Missing	4

Availability of the program

Several participants recalled being unable to attend the program because it was fully booked: 'They didn't have any places...tried to go on the course twice but both times there were no spaces' (John, aged 60) and 'They were actually booked out...the class was full at the time (Sue, aged 74). For Debbie, the issue of availability was linked to the issue of there being set days for the program and one conflicting with her cancer treatment: "There were two exercise sessions per week...one of them was my treatment day so I had to rule it out altogether"' (Debbie, aged 51).

Access, time and cost

Access and timing of classes were common factors influencing uptake to the exercise program. Many participants referred to issues of access with inconvenient exercise locations:

The nearest place to go is Joondalup and it's kind of a hike to go there twice a week to do the exercise. It takes quite a bite out of the day so I'm not sure I would do that (John, aged 60)

For others, there were issues with access, timing and convenience: 'and these classes, the time just didn't suit me...it was timing and where they were, sort of inconvenient getting there' (Jodie, aged 64).

The issue of time together with access was articulated by John: 'A lot of it is time...if you have to travel half an hour

each way twice a week it's a bit of a barrier' (John, aged 60) and Sue: 'There was too much waste of time...the time I'd spend getting up and down there, half a day and they wanted to go for coffee afterwards' (Sue, aged 74). The cost of continuing facility-based exercise was cited as barrier for some: 'the other thing is the actual expense of continuing exercise afterwards...affording to stay in the exercise class because of the money involved' (Jodie, aged 64). Caroline spoke of an acquaintance with issues related to both cost and access: 'she's done two (courses), she can't afford to go back and she's in the hills... there's nothing up there' (Caroline, aged 45).

Lack of motivation or confidence

A lack of motivation or confidence to exercise represented another key theme. Motivation was the primary psychological barrier: 'I need to get back into it because I know exercise is important...but once you get out the habit, it's hard to get back in to it' (Fran, aged 65) and 'just getting around to it, I'm just being lazy' (Jean, aged 70). Others referred to a lack of self-discipline: 'I just don't have the self-discipline to do it' (Jodie, aged 64) and 'I lack motivation to go for a walk' (Debbie, aged 51). Confidence was an influence on program uptake for some: 'I looked like an alien. I could not go where there was people to do some exercises, I'd be too embarrassed so I thought no I can't do it' (Elizabeth, aged 83) and 'some of the exercises if you do them the wrong way, you'd do more damage than good' (Jean, aged 70).

Unwell or fatigued

Being too unwell or fatigued was another reason for non-attendance of the exercise program articulated only by those undergoing treatment, for example, 'It was while I was having chemotherapy and I was just too sick to go' (Diane, aged 67) and for John 'I was too sick for one and then it kind of fizzled out' (John, aged 60). For others, fatigue was a barrier to participation 'I had to ring up and cancel...just physically wasn't there...the fatigue gets quite intense' (Martin, aged 44).

Physical activity preferences

The most dominant and rich theme was that of exercise preferences with many participants expressing an interest in PA that was not gym- or facility-based, for example, 'circuits and gym based that's not what I wanted. I think there should be some mild, simple exercise' (Patricia, aged 87) and 'I don't want to go to a general gym class' (Louise, aged 72). Many participants expressed a preference for home-based PA: 'It might be better if someone could come to your house and give you some to do at home' (Elizabeth, aged 83), 'I might be better doing it at home if I knew what to do as I would make the effort because I need to make sure I stay fit' (Maureen, aged 76) and 'I don't mind

walking in the park on my own' (Fran, aged 65). Several expressed a desire for one-to-one support or guidance: 'for me it's more of a one to one thing...I think if I had a bit of help and support' (Jenny, aged 70). For John:

I think I'd need some more guidance about what are healthy amounts of exercise...what sort of exercises? What would encourage me? Some sort of regular schedule or meetings with somebody...that's once a month or something, you'd meet up with them and they'd ask what you're doing and stuff to encourage you (John, aged 60).

John regularly used a Fitbit on dog walks and said 'the Fitbit kind of monitoring is quite good as well...if you think I've only done 4,000 steps today better go on a longer walk with the dog sort of thing...trying to make sure the weekly thing was at least 70,000 steps' (John, aged 60). Another desired lifestyle coaching:

Coaching I probably need pushing and coaching but I don't know where to find it...the Cancer Council could engage with physios down at University and set up those people to become coaches for people with cancer (Mike, aged 66).

In contrast, some participants desired group-based exercise, finding it more motivational, although these were a minority: 'When you're in a group of people and you do it regularly, you're more likely to attend because you have that social aspect as well' (Martin, aged 44) and 'I enjoyed the group because I got to meet other people and talk to them, compare notes. It would make me want to go more' (Jean, aged 70).

There were also preferences in relation to the appropriate time to begin an exercise program. Most participants suggested that post-treatment would be more appropriate: 'I went post treatment...don't think it would be very advisable for people under treatment might be a bit non-productive' (Paul, aged 74) and 'Chemo is pretty hard going, just feeling sick and no energy you wouldn't feel like getting involved in much exercise' (John, aged 60). Several participants commented that a month after cessation of treatment would be an appropriate time to engage in PA: 'I don't think straight after I finished or during the treatment, I think that would be too much...about a month break' (Fran, aged 65) and 'I think after treatment would be better...I think like a month after treatment would be a good time' (Debbie, aged 51). However, a few participants felt that exercise should be offered both during and after treatment: 'I think you should have the offer there during the treatment' (Martin, aged 44) and 'I think during treatment might be good...sometimes after you've finished you think oh I can't be bothered doing anything now. So maybe during and then keep it going' (Maureen, aged 76).

Knowledge of physical activity guidelines

Only three participants could cite the PA guidelines, for example, ‘30-minutes daily’ (Debbie, aged 51) and ‘I think it’s 30-minutes a day’ (Maureen, aged 76). Most participants did not know the guidelines: ‘I don’t know I was not given guidelines’ (Jenny, aged 70) or tended to overestimate the amount required for health benefits: ‘I thought it was probably a couple of hours a day I don’t know’ (Jean, aged 70). Jodie thought the guidelines were ‘45 minutes or something three times a week’ (Jodie, aged 64). Her response to being given the guidelines was ‘What is moderate intensity?’

Lack of referral or advice

Participants did not recall receiving PA advice from their oncologist: ‘There was nothing mentioned about lifestyle...I think oncologists could sort of give you guidelines a bit more’ (Jean, aged 70), ‘no they don’t talk PA’ (Diane, aged 67) and ‘I saw an oncologist twice a year and a radiation oncologist twice a year ...never talked about lifestyle and the radiation oncologist was for four years’ (Jenny, aged 70). In the only case where PA was advised, no specific recommendation was given:

I didn’t get any of that with my oncologist...I don’t think he ever mentioned exercise until I finished 6-months of chemotherapy and he said now things are good try to get regular exercise...(Interviewer asks ‘did he specify how much?’...no, not at all (John, aged 60).

None of the participants entered the exercise program through referral or recommendation from their treating oncology team. Participants were mostly aware and recruited to the program through advertisements ‘I saw an ad in the local paper’ (Maureen, aged 76) or leaflets ‘they put leaflets around but don’t kind of throw them in your face’ (Amy, aged 48). According to Marion, ‘these programs are there but are not well advertised’ (Diane, aged 67).

Discussion

The main barriers to participation in the ‘Life Now’ exercise program were contextual and included availability, access and time. Classes being fully booked were recalled as a key reason for non-participation. Many participants reported issues with access and time, and the cost of continuing with facility-based exercise was also cited as a barrier. Psychological barriers such as lack of motivation and confidence were also reported. An important finding was lack of referral to the exercise program.

The findings of the current study are consistent with previous research including lack of time or motivation [12–17, 21]. Lack of access to facilities has also been identified as a

prominent barrier to PA participation [12, 16, 17]. However, previous research has identified general barriers to participation, rather than reasons for non-participation in a formal exercise program for survivors.

A key finding was that most participants express a preference for home-based PA rather than gym- or facility-based. This is notable because most existing exercise programs tend to be gym- or group-based. Tailoring PA programs according to patient preferences and psychographic profiling [27] may optimise uptake and adherence. Previous survey-based research in survivors has also found a preference for home-based, unsupervised, moderate-intensity exercise that involves primarily walking [13, 28–30]. Several participants also desired guidance, monitoring or health coaching. Our findings are consistent with studies which have shown a preference for professional guidance or exercise counselling [18, 28]. In the present study, a minority of participants preferred group-based exercise for motivational reasons, but the overwhelming preference was for home-based PA programs with support and monitoring.

Knowledge about PA was limited with only three participants able to recall guidelines, consistent with previous studies [21, 23]. Educating patients about PA guidelines is a priority, because it has been supported as a prerequisite to an individual’s motivation to participate in regular PA [31].

Consistent with previous research [21, 23, 32, 33], most participants did not recall receiving lifestyle advice during or following treatment. No participant was referred or recommended to the program by their treating oncologist which is disappointing because cancer patients who receive PA advice from their specialists may be more likely to engage in sufficient activity levels [32, 34].

Few studies have investigated the timing of when survivors may be most receptive to exercise interventions [35], and a novel finding was that most participants preferred to receive PA advice following treatment. However, in view of evidence that PA improves quality of life and reduces treatment-related symptoms [1, 2, 36], patients should also be encouraged to engage in PA during treatment.

Clinical implications

Given patients’ lack of knowledge concerning guidelines, oncologists play a valuable role in the promotion of PA. The ‘Green prescription’, involving written advice from a General Practitioner, is an intervention that has been used successfully in primary health care [37, 38]. Oncologists could administer the validated General Practitioner PA questionnaire (GPPAQ), as a screening tool to identify inactive patients [39] who are then given a printed exercise prescription and a brief rationale concerning the importance of exercise in preventing functional decline, reducing fatigue and reducing CVD risk and cancer recurrence [34]. Given the findings in relation to PA

preferences, home-based interventions hold much promise in addition to overcoming barriers associated with facility-based exercise programs such as availability, access and time [34].

Strengths and limitations

Our study has certain limitations including recall bias and a low response rate which may have introduced response bias. Participants had a variety of cancer types, were treated in Western Australia and our findings may not be transferable to other similar formal group-based exercise programs for cancer survivors.

Conclusion

In this study, barriers to participation in the ‘Life Now’ exercise program were contextual and included availability, access and time and psychological barriers such as lack of motivation and confidence. An important finding was the preference for home-based PA rather than gym- or facility-based. Knowledge of PA guidelines was limited and participants did not recall their oncologists making specific PA recommendations. No participant was referred or recommended to the program by their oncologist. Effective interventions will likely require referral from oncologists to allied health professionals to provide individualised care, which meets survivors’ specific needs.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

- Cramp F, Daniel J (2010) Exercise for the management of cancer-related fatigue in adults. *Cochrane Database Syst Rev* CD006145(2):1–37
- Craft LL, Vaniterson EH, Helenowski IB (2012) Exercise effects on depressive symptoms in cancer survivors: a systematic review and meta-analysis. *Cancer Epidemiol Biomark Prev* 21(1):3–19
- Keats MR, Cui Y, Grandy SA, Parker L (2016) Cardiovascular disease and physical activity in adult cancer survivors: a nested retrospective study from the Atlantic PATH cohort. *J Cancer Surviv*. <https://doi.org/10.1007/s11764-016-0584>
- Friedenreich CM, Neilson H, Farris M et al (2016) Physical activity and cancer outcomes. *Clin Cancer Res* 22:4766–4775
- Baade PD, Frischi L, & Eakin E. Non-cancer mortality among people diagnosed with cancer, *Cancer Causes Control* 2006;17(3):287–297
- Doyle C, Kushi L, Byers T, Courneya KS, Demark-Wahnefried W, Grant B (2006) Nutrition and physical during and after cancer treatment: an American Cancer Society guide for informed choices. *CA Cancer J Clin* 55(6):323–353
- Rock CL, Doyle C, Demark-Wahnefried W, Meyerhardt J, Courneya KS, Schwartz AL et al (2012) Nutrition and physical activity guidelines for cancer survivors. *CA Cancer J Clin* 62: 242–274
- Eakin EG, Youlden DR, Baade PD, Lawler SP, Reeves MM, Heyworth JS (2006) Health status of long-term cancer survivors: results from an Australian population-based sample. *Cancer Epidemiol Biomark Prev* 15(10):1969–1976
- Underwood JM, Townsend JS, Stewart SL, Buchanan N (2012) Surveillance of demographic and health behaviours among adult cancer survivors- behavioural risk factors surveillance system, United States, 2009. *Surveillance Summ* 61(SS01):1–23
- Leach CR, Weaver KE, Aziz NM, Alfano CM, Rowland JH (2015) The complex health profile of long-term cancer survivors: prevalence and prediction of comorbid conditions. *J Cancer Surviv*. <https://doi.org/10.1007/s11764-014-043-1>
- Peeters C, Stewart A, Segal R, Wouterloot E, Scott CG, Aubry T (2009) Evaluation of a cancer program: patient and physician beliefs. *Psycho-Oncology* 18(8):898–902
- Beehler GP, Rodrigues AE, Kay MA, Kiviniemi MT, Steinbrenner L (2014) Perceptions of barriers and facilitators to health behaviour change among veteran cancer survivors. *Mil Med* 179(9):998–1005
- Blaney JM, Lowe-Strong A, Rankin-Watt J, Campbell A, Gracey JH (2013) Cancer survivors’ exercise barriers, facilitators and preferences in the context of fatigue, quality of life and physical activity participation: a questionnaire-survey. *Psycho-Oncology* 22(1):186–194. <https://doi.org/10.1002/pon.2072>
- Courneya KS, Friedenreich CM, Quinney HA, Fields ALA, Jones LW, Vallance JKH, Fairey AS (2005) A longitudinal study of exercise barriers in colorectal cancer survivors participating in a randomized controlled trial. *Ann Behav Med* 29(2):147–153
- Ottensbacher AJ, Day RS, Taylor WC, Sharma SV, Sloane R, Snyder DC, Kraus WE, Demark-Wahnefried W (2011) Exercise among breast and prostate cancer survivors—what are their barriers? *J Cancer Surviv* 5(4):413–419. <https://doi.org/10.1007/s11764-011-0184-8>
- Rogers LQ, Courneya KS, Shah P, Dunnington G, Hopkins-Price P (2007) Exercise stage of change, barriers, expectations, values and preferences among breast cancer patients during treatment: a pilot study. *Eur J Cancer Care* 16:55–66. <https://doi.org/10.1111/j.1365-2354.2006.00705.x>
- Hardcastle SJ, Maxwell-Smith C, Zeps N, Platell C, O’Connor M, Hagger MS (2016) A qualitative study exploring health perceptions and factors influencing participation in health behaviors in colorectal cancer survivors. *Psycho-Oncology*. <https://doi.org/10.1002/pon.4111>
- Jones LW, Courneya KS (2002) Exercise counselling and programming preferences of cancer survivors. *Cancer Pract* 10(4):208–215
- Fisher A, Wardle J, Beeken RJ, Croker H, Williams K, Grimmett C (2016) Perceived barriers and benefits to physical activity in colorectal cancer patients. *Support Care Cancer* 24(2):903–910. <https://doi.org/10.1007/s00520-015-2860-0>
- Hefferon K, Murphy H, McLeod J, Mutrie N, Campbell A (2013) Understanding barriers to exercise implementation 5-years post-breast cancer diagnosis: a large scale qualitative study. *Health Ed Res* 28(5):843–856
- Hardcastle SJ, Glassey R, Tan J, Cohen P (2016) Factors influencing participation in health behaviours in endometrial cancer survivors. *Psycho-Oncology*. <https://doi.org/10.1002/pon.4288>
- Tong A, Sainsbury P, Craig J (2007) Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 19(6):349–357
- Maxwell-Smith C, Zeps N, Hagger MS, Platell C, Hardcastle SJ (2016) Barriers to physical activity participation in colorectal cancer survivors. *Psycho-Oncology*. <https://doi.org/10.1002/pon.4234>

24. Sparkes AC, Smith B (2014) *Qualitative research methods in sport, exercise and health*. Routledge, London
25. Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qual Res Psychol* 3:77–101. <https://doi.org/10.1191/1478088706qp063oa>
26. Hardcastle SJ, Hagger MS (2011) “You can’t do it on your own”: experiences of a motivational interviewing intervention on physical activity and dietary behaviour. *Psychol Sport Exerc* 12:314–323
27. Hardcastle SJ, Hagger MS (2016) Psychographic profiling for effective health behaviour change interventions. *Front Psychol*. <https://doi.org/10.3389/fpsyg.2015.01988>
28. McGowan EL, Speed-Andrews AE, Blanchard CM, Rhodes RE (2013) Friedenreich CM...Kourneya KS. Physical activity preferences among a population-based sample of colorectal cancer survivors. *Oncol Nurs Forum* 40(1):44–52
29. Rogers LQ, Markwell SJ, Verhulst S, McAuley E, Courneya KS (2009) Rural breast cancer survivors: exercise preferences and their determinants. *Psycho-Oncology* 18(4):412–421
30. Stevinson C, Capstick V, Schepansky A, Tonkin K, Vallance J et al (2009) Physical activity preferences of ovarian cancer survivors. *Psycho-Oncology* 18(4):222–228
31. World Health Organization (2012) *Health education: Theoretical concepts, effective strategies and core competencies*. Cairo 1–82. <https://doi.org/10.1177/1524839914538045>
32. Fisher A, Williams K, Beeken R, Wardle J (2015) Recall of physical activity advice was associated with higher levels of physical activity in colorectal cancer patients. *BMJ Open* 5. <https://doi.org/10.1136/bmjopen-2014-006853>
33. Karvinen KH, DuBose KD, Carney B (2010) Promotion of physical activity amongst oncologists in the US. *J Support Oncol* 8:35–41
34. Hardcastle SJ, Cohen PA (2017) Effective physical activity promotion to cancer survivors is likely to be home-based and to require oncologist participation. *J Clin Oncol JCO2017746032*. <https://doi.org/10.1200/JCO.2017.74.6032>
35. Wahnefried W, Jones LW (2008) Promoting a healthy lifestyle among cancer survivors. *Hematol Oncol Clin North Am* 22: 319–342
36. Mishra SI, Scherer RW, Geigle PM, Berlanstein DR, Snyder C (2012) Exercise interventions on health-related quality of life for cancer survivors. *Cochrane Database Syst Rev* 8:CD007566
37. Hamlin MJ, Yule E, Elliott CA, Stoner L, Kathiravel Y (2016) Long-term effects of a New Zealand green prescription program in primary health care exercise initiative. *Public Health* 140: 102–108
38. Garrett S, Elley CR, Rose SB, O’Dea D, Lawton BA, Dowell AC (2011) Are physical activity interventions in primary care and the community cost-effective? A systematic review of the evidence. *Br J Gen Pract* 61(584):e125–e133
39. Department of Health (2009) *The General Practitioner Physical Activity Questionnaire: a screening tool to assess physical activity levels, within Primary care*. DOH, London