Original article

A randomized controlled trial of Promoting Physical Activity in Regional and Remote Cancer Survivors (PPARCS)

Sarah J Hardcastle [a,b,c,*], Chloe Maxwell-Smith [c], Vinicius Cavalheri [d,e], Terry Boyle [f], Marta Leyton Román [g], Cameron Platell [h], Michael Levitt [h], Christobel Saunders [h,i], Frank Sardelic [j], Sophie Nightingale [j], Jacob McCormick [k], Craig Lynch [l], Paul A. Cohen [b,h,m], Max Bulsara [b], Dana Hince [b]

[a] Sport and Physical Activity Research Centre, Sheffield Hallam University, Sheffield, S10 2BP, UK

[b] Institute for Health Research, The University of Notre Dame, Fremantle, WA 6959, Australia

[c] Curtin School of Population Health, Curtin University, Perth, WA 6845, Australia

[d] Curtin School of Allied Health, Curtin University, Perth, WA 6845, Australia

[e] Allied Health, South Metropolitan Health Service, Murdoch, WA 6150, Australia

[f] Australian Centre for Precision Health, University of South Australia, Adelaide, SA 5001, Australia

[g] Department of Didactics of Musical, Plastic and Body Expression, University of Extremadura, Caceres 10071, Spain

[h] St. John of God Subiaco Hospital, Perth, WA 6008, Australia

[l] Department of Surgery, University of Melbourne, Melbourne, VIC 3010, Australia

[j] Tamara Private Hospital, Tamworth, NSW 2340, Australia

[k] Peter MacCallum Cancer Centre, Melbourne, VIC 3000, Australia

[l] College of Health and Medicine, Australian National University, Canberra, ACT 2600, Australia

[m] Division of Obstetrics and Gynaecology, Medical School, University of Western Australia, Perth, WA 6009, Australia

* Corresponding author.

Email address: Sarah.Hardcastle@shu.ac.uk

Running title: PPARCS trial to promote PA in cancer survivors

Supplementary Tables

Supplementary Table 1. Estimated between arm (net mean difference) and within arm (T2–T1) mean differences (95%CI) for MVPA and secondary ActiGraph activity outcomes for completers (data available for both T1 and T2), protocol adherers (completed 4 or more health-coaching sessions), and insufficiently active participants (<150 min/week MVPA from ActiGraph at T1).

	Intervention change–Control change (T2)		Arm x Time interaction		Intervention change (T2–T1)		Control change (T2–T1)	
	Net mean difference	95%CI	$\chi^2(1)^1$	p	Mean difference	95%CI	Mean difference	95%CI
COMPLETERS (*n* = 72)								
MVPA (min/week)	45.1	8.3 to 81.9	5.77	**0.016**	64.7	37.0 to 92.5	19.6	–4.5 to 43.8
MV10	38.0	10.0 to 66.0	7.08	**0.008**	48.2	25.5 to 71.0	10.2	–5.4 to 28.8
Moderate PA (min/week)	44.5	7.5 to 81.5	5.56	**0.018**	60.7	32.7 to 88.6	16.1	–8.1 to 40.4
Light (min/week)	–2.2	–177.7 to 173.3	0.00	0.980	131.6	–0.8 to 264.1	133.9	18.7 to 249.0
Sedentary time (min/week)	–49.0	–256.5 to 158.4	0.21	0.643	–184.1	–340.7 to –27.5	–135.1	–271.3 to 1.07
Sedentary ≥20–min bouts (h/week)	–37.8	–255.9 to 180.3	0.12	0.734	–54.7	–219.3 to 109.9	–16.9	–160.0 to 126.2
PROTOCOL ADHERERS								

(*n* = 80)

MVPA (min/week)	47.8	11.3 to 84.3	6.6	**0.010**	66.7	39.2 to 94.2	18.9	−5.1 to 42.9
MV10	37.9	9.9 to 65.8	7.1	**0.008**	48.2	24.5 to 71.9	10.3	−5.5 to 26.2
Moderate PA (min/week)	47.4	10.6 to 84.1	6.4	**0.012**	62.7	35.1 to 90.3	15.3	−8.8 to 39.5
Light (min/week)	11.8	−162.9 to 186.4	0.02	0.895	139.8	8.3 to 271.4	128.1	13.2 to 242.9
Sedentary time (min/week)	−54.7	−261.4 to 152.0	0.27	0.604	−184.1	−339.8 to −28.5	−129.4	−265.4 to 6.6
Sedentary	−42.4	−259.4 to 174.6	0.15	0.702	−51.9	−215 to 111.5	−9.6	−152.4 to 133.3
≥20–min bouts (h/week)								

INSUFFICIENTLY
ACTIVE (*n* = 54)

MVPA (min/week)	30.4	−4.2 to 65.0	2.96	0.085	61.0	34.3 to 87.6	30.6	8.5 to 52.7
MV10	31.9	−3.5 to 67.3	3.12	0.078	47.5	18.4 to 76.7	15.6	−4.4 to 35.6
Moderate PA (min/week)	22.5	−9.5 to 54.6	1.90	0.168	52.7	28.0 to 77.4	30.1	9.7 to 50.6
Light (min/week)	−84.9	−287.0 to 117.2	0.68	0.411	98.4	−59.3 to 256.1	183.3	56.9 to 309.7
Sedentary time (min/week)	44.6	−210.6 to 299.8	0.12	0.732	−124.8	−323.4 to 73.9	−169.4	−329.5 to −9.2

Sedentary	–9.2	–319.6 to 301.2	0.00	0.954	6.3	–234.9 to 247.5	15.5	–179.8 to 210.9

≥20-min bouts (h/week)

Mean differences are estimated from the mixed model.

[1] Wald χ^2 test for the Arm x Time interaction.

Abbreviations: 95%CI = 95% confidence interval; MV10 = minutes of moderate–to-vigorous physical activity completed in bouts of at least 10 min MVPA = moderate-to-vigorous physical activity; PA = physical activity. T1= Baseline ; T2 = 12-weeks following baseline.

Supplementary Table 2. Estimated between arm (net mean difference) and within arm (T2–T1) mean differences (95%CI) for ActiGraph-derived outcomes following adjustments for sex, cancer type, ActiGraph wear-time, age, comorbidity index, and remoteness classification (inner rural *vs*. other).

		Intervention change–Control change (T2)		Arm x Time interaction[1]		Intervention change (T2–T1)		Control change (T2–T1)	
	Covariate	Adjusted net difference	95%CI	$\chi^2(1)$	p	Adjusted mean difference	95%CI	Adjusted mean difference	95%CI
MVPA (min/week)	Sex	49.8	13.5 to 86.0	7.25	**0.007**	68.6	41.4 to 95.8	18.8	−5.1 to 42.8
	Cancer type	50.2	14.0 to 86.5	7.37	**0.007**	68.9	41.7 to 96.2	18.7	−5.3 to 42.9
	Wear-time (min)	49.3	13.0 to 85.7	7.07	**0.008**	67.7	40.4 to 95.0	18.4	−5.7 to 42.4
	Age	49.9	13.7 to 86.1	7.31	**0.007**	69.6	42.4 to 96.7	19.6	−4.3 to 43.6
	Comorbidity index	48.3	12.1 to 84.4	6.85	**0.009**	67.5	40.4 to 94.6	19.2	−4.7 to 43.1
	Remoteness	45.7	9.6 to 81.9	6.17	**0.013**	64.6	37.4 to 91.9	18.9	−4.8 to 42.6
MV10 (min/week)	Sex	39.7	12.1 to 67.2	8.0	**0.005**	50.1	27.9 to 72.3	10.4	−5.3 to 26.2
	Cancer type	40.2	12.6 to 67.8	8.2	**0.004**	50.3	28.1 to 72.4	10.1	−5.6 to 25.8
	Wear–time (min)	38.0	10.8 to 65.3	7.5	**0.006**	48.1	26.5 to 69.8	10.1	−5.9 to 26.1
	Age	38.8	11.4 to 66.3	7.7	**0.006**	50.1	28.1 to 72.1	11.3	−4.6 to 27.1
	Comorbidity index	38.7	11.2 to 66.2	7.6	**0.006**	49.2	27.1 to 71.4	10.5	−5.2 to 26.2
	Remoteness	43.4	17.0 to 69.8	10.4	**0.001**	53.9	32.0 to 75.8	10.5	−4.5 to 25.4
Moderate PA (min/week)	Sex	49.4	13.0 to 85.8	7.07	**0.008**	64.7	37.4 to 92.0	15.3	−8.8 to 39.4
	Cancer type	49.8	13.4 to 86.3	7.18	**0.007**	65.0	37.7 to 92.3	15.2	−8.9 to 39.3
	Wear–time (min)	49.0	12.4 to 85.6	6.89	**0.009**	63.9	36.4 to 91.4	14.9	−9.3 to 39.1
	Age	49.5	13.1 to 85.9	7.12	**0.008**	65.6	38.4 to 92.8	16.1	−8.0 to 40.2
	Comorbidity index	47.9	11.6 to 84.2	6.68	**0.010**	63.6	36.4 to 90.8	15.7	−8.3 to 39.7
	Remoteness	43.6	7.9 to 79.3	5.74	**0.017**	59.0	32.1 to 85.9	15.4	−8.0 to 38.8

Light PA (min/week)	Sex	34.4	−140.0 to 208.8	0.15	0.699	163.3	32.3 to 294.2	128.8	13.7 to 244.0
	Cancer type	29.3	−145.0 to 203.5	0.11	0.742	158.2	27.3 to 289.0	128.9	13.9 to 244.0
	Wear-time (min)	23.5	−140.1 to 187.1	0.08	0.778	143.9	21.0 to 266.9	120.4	12.4 to 228.5
	Age	31.0	−143.5 to 205.5	0.12	0.728	161.1	30.1 to 292.1	130.1	14.8 to 245.4
	Comorbidity index	25.6	−148.2 to 199.4	0.08	0.773	154.9	24.4 to 285.4	129.3	14.5 to 244.1
	Remoteness	9.7	−163.9 to 183.3	0.01	0.913	138.4	7.1 to 269.8	128.7	15.1 to 242.3
Sedentary time (min/week)	Sex	−68.7	−274 to 136.9	0.43	0.512	−199.2	−353.3 to −45.1	−130.5	−266.6 to 5.6
	Cancer type	−62.7	−268.5 to 143.0	0.36	0.550	−193.1	−347.4 to −38.9	−130.4	−266.6 to 5.7
	Wear-time (min)	−71.6	−246.9 to 103.8	0.64	0.424	−210.7	−342.5 to −78.9	−139.1	−254.9 to −23.3
	Age	−63.0	−268.3 to 142.3	0.36	0.548	−195.4	−349.3 to −41.6	−132.4	−268.4 to 3.5
	Comorbidity index	−56.0	−260.9 to 148.8	0.29	0.591	−187.3	−340.8 to −33.7	−131.2	−266.7 to 4.3
	Remoteness	−28.0	−227.6 to 171.5	0.08	0.783	−158.0	−308.8 to −7.3	−130.0	−260.8 to 0.7
Sedentary ≥20-min bouts (min/week)	Sex	−62.0	−278.4 to 154.4	0.32	0.575	−72.9	−235.1 to 89.3	−10.9	−154.3 to 132.4
	Cancer type	−52.1	−268.7 to 164.4	0.22	0.637	−63.2	−225.5 to 99.1	−11.1	−154.4 to 132.2
	Wear-time (min)	−58.7	−266.9 to 149.5	0.31	0.581	−72.3	−228.7 to 84.2	−13.6	−151.2 to 124.1
	Age	−53.5	−270.1 to 163.1	0.23	0.628	−66.8	−229.1 to 95.5	−13.3	−156.8 to 130.2
	Comorbidity index	−44.5	−259 to 170.9	0.16	0.685	−56.3	−217.7 to 105.2	−11.7	−154.2 to 130.8
	Remoteness	−25.2	−238.8 to 188.3	0.05	0.817	−35.7	−197.0 to 125.6	−10.5	−150.4 to 129.4

Months since diagnosis was not included due to missing data for this variable. Mean differences are estimated from the mixed model.

[1] Wald χ^2 test for the Arm x Time interaction.

Abbreviations: 95%CI = 95% confidence interval; MV10 = minutes of moderate-to-vigorous physical activity completed in bouts of at least 10 minutes MVPA = moderate-to-vigorous physical activity; PA = physical activity. T1= Baseline ; T2 = 12-weeks following baseline .