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Translation research: 'Back on Track', a multiprofessional rehabilitation service for cancer-related fatigue

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ABSTRACT

Objectives To assess the effectiveness and acceptability of an individually tailored rehabilitation intervention for patients with cancer-related fatigue (CRF).

Methods Eighteen individuals, (16 female, two male, aged 40–83 years), who self-reported CRF (above four on a 10-point Likert scale) took part in an 8 week physical activity intervention weekly review and optional gym-based support. Fifteen participants had a primary diagnosis of breast cancer and along with the other participants had multiple myeloma, colorectal or prostate cancer.

All participants took part in a goal-oriented walking and muscle strengthening programme with dietary advice and psychological support based on the Transtheoretical Model (TTM) of behaviour change. Effectiveness was assessed by physical and psychological outcomes. Focus groups with participants and individual interviews with the professionals delivering the intervention explored the feasibility and acceptability of the intervention.

Results Statistically significant improvements were seen in the primary outcome of fatigue and on the secondary outcomes of physical function, depression and in triceps skin fold thickness reduction. Participants endorsed the intervention as being highly acceptable, holistic and as important as medical treatments for cancer. The importance of team working was highlighted as key to service delivery and success.

Conclusions A multidisciplinary home-based tailored intervention with optional weekly gym attendance is acceptable to people with CRF, improving physical and psychosocial outcomes. Study limitations and suggestions for further research are discussed.

INTRODUCTION

Cancer-related fatigue (CRF) is characterised by 'persistent overwhelming exhaustion and a decreased capacity for physical and mental work'.¹ CRF affects 70–100% of patients² and is associated

with psychological distress^{3,4} and reduced quality of life.^{5,6} Management of CRF varies:⁷ evidence is mounting that physical activity (PA)-based rehabilitation, including resistance exercises improve function and quality of life.^{8–11}

Interventions for CRF developed using behaviour change theory tend to result in better patient-reported outcomes.¹² There is a lack of translational research on the service delivery of individualised rehabilitation interventions based on the Transtheoretical Model (TTM).³

Primary objective

Assessing effectiveness and acceptability of an individually tailored exercise rehabilitation intervention 'Back on Track' (BoT) for CRF.

METHOD

Mixed methods were used, baseline outcome measures were taken before and after an 8 week intervention, and focus groups and semistructured interviews were conducted postintervention.

Inclusion criteria

Ambulatory
CRF (above 4 on a 10-point scale).

Exclusion criteria

A medical or psychiatric illness that could make adherence to the study protocol difficult.

Recruitment

An information pamphlet was mailed to 1500 members of a local cancer charity. Individuals meeting the inclusion criteria were invited to phone the research team. Those screened as suitable were sent a copy of the consent form and invited to participate.

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Short report

Table 1 Baseline and postintervention outcomes for non-parametric tests†

Outcome	Baseline			Postintervention			Z score†	p Value
	Centiles			Centiles				
	25th	Median	75th	25th	Median	75th		
6MWT‡	348.2	502.5	545.4	505.0	571.0	582.5	−3.62	<0.001**
TSTS§	3.5	5.0	6.8	3.12	3.4	4.0	−3.34	0.001**
FACT-G	68.5	81.0	90.0	83	90.0	101.8	−1.86	0.062
BDI	10.8	12.5	17.3	2.0	3.0	7.5	−3.41	0.001**

**Significant at $p \leq 0.001$.

†Wilcoxon.

‡Distance in metres.

§Time in seconds.

BDI, Beck Depression Inventory; FACT-G, Functional Assessment of Cancer Therapy-General; 6MWT, 6 Minute Walk Test; TSTA, Timed Sit To Stand.

Participants

Twenty-five individuals expressed interest in the study, of which 16 women and 2 men met the inclusion criteria. Average age was 61, (range of 40–83). Fifteen participants had breast cancer as a primary diagnosis. The other diagnoses were multiple myeloma, prostate and colon cancer. The average length of time since diagnosis was 5.39 years (SD=4.86).

Materials and equipment

The study was based in a university rehabilitation facility. Participants were encouraged to exercise for at least 5 min for at least 2 days of the first week increasing progressively over the 8 weeks to at least 15 min for a minimum of 5 days a week. The recommended exercises were walking supported by strengthening exercise for major muscle groups. An information booklet, exercise diary and pedometer were provided as part of the PA consultation. Participants were asked to record daily step count and exercises undertaken as well as to list any barriers to activity they encountered. Review of the exercise diary and activity goals were discussed either by telephone or during an optional weekly circuit class involving a variety of supervised exercises.

Outcome measurement

Assessments, including exercise, medical and dietary history, were undertaken by the multidisciplinary team consisting of a physiotherapist, doctor, health psychologist and dietitian. Outcome measures at baseline and postrehabilitation intervention included the Edmonton Symptom Assessment System (ESAS),¹³ Functional Assessment of Cancer Therapy-General (FACT-G),⁴ Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F)⁵ and Beck Depression Inventory (BDI).⁶ Physical outcome measures included the 6 Minute Walk Test (6MWT),¹⁴ Timed Sit To Stand (TSTS) test,¹⁵ activity diary and pedometer step count. At completion, participants received a consultation regarding future activity management.

Qualitative evaluation

An external facilitator conducted focus groups with participants and semistructured interviews with staff delivering the BoT programme 4 weeks after programme completion.

RESULTS

Of the 18 participants who enrolled, 17 completed BoT, of whom 6 opted to attend the gym-based sessions. 13 participants were involved in focus group discussions. PA behaviour increased as evidenced through activity diaries and pedometer step counts, which increased from an average total of 27 549 steps in week 1 (n=18) to 41 941 by week 8 (n=14). No significant differences were noted between gym attenders and non-attenders in relation to PA levels.

The Shapiro-Wilk test and inspection of Q–Q plots were used to determine normality of data. Statistically significant improvements in median scores using Wilcoxon were found for 6MWT and TSTS. Mean fatigue (FACIT-F) and median depression (BDI) scores were significantly reduced (see [tables 1](#) and [2](#)). Dependent t test results on FACIT-F, ESAS and BMI were not statistically significant.

Qualitative findings

Thematic analysis highlighted the benefit of the programme to individuals. Reduction in fatigue, return of function, increased activity and sense of fulfilment were perceived benefits. Multiprofessional input, the

Table 2 Baseline and postintervention outcomes for parametric tests*

Outcome	Baseline		Postintervention		t Value	p Value
	Mean	SD	Mean	SD		
FACIT-F	24.75	10.45	38.50	10.51	−5.43	0.0005
ESAS	24.71	16.40	19.94	13.42	1.15	0.27
BMI	27.76	5.38	27.43	5.43	1.75	0.10

*Dependent t tests.

BMI, body mass index; ESAS, Edmonton Symptom Assessment System; FACIT-F, Functional Assessment of Chronic Illness Therapy-Fatigue.

benefits of physical, psychological, supportive guidance and weekly contact were additional themes highlighted. The study documentation and pedometer were also highly acceptable to the participants.

BoT team interviews highlighted the importance of team working, the therapeutic alliance formed with participants and the unanimous view that the intervention supported a significant improvement in participant quality of life. The key challenges highlighted by staff were resourcing and optimising the referral strategy to implement such a service.

DISCUSSION

An individualised PA programme (BoT) of 8 weeks had a positive impact on participant fatigue and function, suggesting CRF can be improved with individualised exercise rehabilitation. A limitation of this study was the low recruitment rate. The culture change required and the referral method for rehabilitation interventions requires careful investigation and planning to ensure optimum use of resource. The integration of behaviour change in delivery of advice and support for CRF requires investigation.

CONCLUSION

A multidisciplinary home-based tailored intervention with optional weekly gym attendance was acceptable to people with CRF. While participants were highly motivated, results indicate that this PA-based rehabilitation intervention significantly improved fatigue, functional and psychological well-being in participants.

Contributors JHG, MW, CP, JR and LD were involved in planning the study. JHG, MW, CP, JR and LD submitted the study for ethical review and governance approval. JHG, MW, CP and LD delivered the programme. JHG, MW, CP and LD were involved in the writing of the report. JHG, MW, CP, JR and LD reviewed and finalised the report. JHG, MW and LD were guarantors.

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REFERENCES

- 1 Mustian KM, Sprod LK, Palesh OG, *et al.* Exercise for the management of side effects and quality of life among cancer survivors. *Current Sports Medicine Reports* 2009;8:325–30.
- 2 Dimeo FC. Effects of exercise on cancer-related fatigue. *Cancer* 2001;92(6 Suppl):1689–93.
- 3 DiClemente CC, Prochaska JO. Toward a comprehensive transtheoretical model of change: stages of change and addictive behaviors. In: Miller WR, Health N, eds. *Treating addictive behaviors*. 2nd edn. New York, London: Plenum Press, 1998:3–24.
- 4 Cella DF, Tulsky DS, Gray G, *et al.* The functional assessment of cancer therapy scale: development and validation of the general measure. *J Clin Oncol* 1993;(3):570–9.
- 5 Yellen SB, Cella DF, Webster K, *et al.* Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. *J Pain Symptom Manage* 1997;13:63–74.
- 6 Beck AT, Ward CH, Mendelson M, *et al.* An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561–71.
- 7 Mock V. Evidence-based treatment for cancer-related fatigue. *J Natl Cancer Inst Monogr* 2004(32):112–18.
- 8 Cramp F, Daniel J. Exercise for the management of cancer-related fatigue in adults. *Cochrane Database Syst Rev* 2008;(2):CD006145.
- 9 Courneya KS, Friedenreich CM, Quinney HA, *et al.* A randomized trial of exercise and quality of life in colorectal cancer survivors. *Eur J Cancer Care (Engl)* 2003;12:347–57.
- 10 NCCN. Cancer-Related Fatigue Version 1.2; 2011.
- 11 Velthuis MJ, Van den Bussche E, May AM, *et al.* Fear of movement in cancer survivors: validation of the modified Tampa scale of kinesiophobia-fatigue. *Psychooncology* 2012;21:762–70.
- 12 Velthuis MJ, Agasi-Idenburg SC, Aufdemkampe G, *et al.* The effect of physical exercise on cancer-related fatigue during cancer treatment: a meta-analysis of randomised controlled trials. *Clin Oncol (R Coll Radiol)* 2010;22:208–21.
- 13 Bruera E, Macdonald S. Audit methods: the Edmonton symptom assessment. In: Higginson I, ed. *Clinical audit in palliative care*. Oxford: Radcliffe Medical Press, 1993:61–77.
- 14 ATS Committee on Proficiency Standards for Clinical Pulmonary Function Laboratories. ATS statement: guidelines for the six-minute walk test. *Am J Respir Crit Care Med* 2002;166:111–17.
- 15 Oldervoll LM, Loge JH, Paltiel H, *et al.* The effect of a physical exercise program in palliative care: a phase II study. *J Pain Symptom Manage* 2006;31:421–30.

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