

A pedometer-based walking intervention in 45- to 75-year-olds, with and without practice nurse support: the PACE-UP three-arm cluster RCT

Tess Harris,^{1*} Sally Kerry,² Christina Victor,³ Steve Iliffe,⁴ Michael Ussher,¹ Julia Fox-Rushby,⁵ Peter Whincup,¹ Ulf Ekelund,^{6,7} Cheryl Furness,¹ Elizabeth Limb,¹ Nana Anokye,⁵ Judith Ibison,¹ Stephen DeWilde,¹ Lee David,⁸ Emma Howard,¹ Rebecca Dale,¹ Jaime Smith,¹ Rebecca Normansell,¹ Carole Beighton,¹ Katy Morgan,² Charlotte Wahlich,¹ Sabina Sanghera⁵ and Derek Cook¹

¹Population Health Research Institute, St George's, University of London, London, UK

²Pragmatic Clinical Trials Unit, Queen Mary University of London, London, UK

³Gerontology and Health Services Research Unit, Brunel University London, London, UK

⁴Research Department of Primary Care and Population Health, University College London, London, UK

⁵Health Economics Research Group, Brunel University London, London, UK

⁶Department of Sports Medicine, Norwegian School of Sport Sciences, Oslo, Norway

⁷Medical Research Council Epidemiology Unit, University of Cambridge, Cambridge, UK

⁸10 Minute CBT, Devonshire Business Centre, Letchworth Garden City, UK

*Corresponding author tharris@sgul.ac.uk

Declared competing interests of authors: Lee David is the director of 10 Minute CBT. She helped to develop Pedometer And Consultation Evaluation-UP (PACE-UP) patient resources and training for the PACE-UP nurses and received personal fees from 10 Minute CBT during the conduct of this study.

Tess Harris is a member of the National Institute for Health Research (NIHR) Health Technology Assessment Primary Care and Community Preventative Interventions panel. Julia Fox-Rushby reports grants from the NIHR and membership of the Public Health Research Research Funding Board during the conduct of the study. Katy Morgan's salary was funded through a NIHR research methods fellowship (reference number MET-12-16), during the conduct of the study.

Published June 2018

DOI: 10.3310/hta22370

Plain English summary

Pedometer-based walking intervention in 45- to 75-year-olds: PACE-UP RCT

Health Technology Assessment 2018; Vol. 22: No. 37

DOI: 10.3310/hta22370

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Plain English summary

Physical inactivity is common and causes ill health. Walking briskly enough to make you warm and increase breathing and heart rate, but allow conversation, is moderate-intensity physical activity. Brisk walking for 30 minutes most days is a good way to improve health. Pedometers measure step counts and can increase physical activity levels, but few studies involving pedometers have objectively measured participants' physical activity or included long-term follow-up.

The Pedometer And Consultation Evaluation-UP (PACE-UP) trial recruited 1023 inactive 45- to 75-year-olds from seven South London practices, and randomised them to a usual physical activity (control) group or to one of two intervention groups. The postal group participants were sent a pedometer, diary and 12-week pedometer-based walking programme, advising them to gradually add in 3000 steps or a 30-minute walk on 5 or more days weekly. The nurse-support group received the same materials through practice nurse physical activity consultations. Physical activity and participant-reported 12-month outcomes were compared with the beginning of the trial, along with the costs of each trial group. A further 3-year follow-up was conducted and long-term value for money was estimated.

Both intervention groups significantly increased their walking (step counts and time in moderate-intensity physical activity) compared with controls, with no difference between nurse and postal groups. Interventions were safe and acceptable to participants and nurses. There was no effect on body size, pain or depression, but the nurse-support group participants increased their confidence in their ability to exercise. The 3-year follow-up found persistent positive effects of both interventions on physical activity levels. The postal intervention provided more value for money than the nurse-support group or the control group in the short and long term.

A primary care pedometer intervention, delivered by post or with nurse support, could provide an effective way to increase physical activity levels in adults and older adults, with the postal route offering the most value for money.

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Impact factor: 4.236

Health Technology Assessment is indexed in MEDLINE, CINAHL, EMBASE, The Cochrane Library and the Clarivate Analytics Science Citation Index.

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: journals.library@nhr.ac.uk

The full HTA archive is freely available to view online at www.journalslibrary.nhr.ac.uk/hta. Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: www.journalslibrary.nhr.ac.uk

Criteria for inclusion in the *Health Technology Assessment* journal

Reports are published in *Health Technology Assessment* (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

For more information about the HTA programme please visit the website: <http://www.nets.nhr.ac.uk/programmes/hta>

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 10/32/02. The contractual start date was in March 2012. The draft report began editorial review in June 2017 and was accepted for publication in November 2017. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2018. This work was produced by Harris *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This issue may be freely reproduced for the purposes of private research and study and extracts (or indeed, the full report) may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Published by the NIHR Journals Library (www.journalslibrary.nhr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).

NIHR Journals Library Editor-in-Chief

Professor Tom Walley Director, NIHR Evaluation, Trials and Studies and Director of the EME Programme, UK

NIHR Journals Library Editors

Professor Ken Stein Chair of HTA and EME Editorial Board and Professor of Public Health, University of Exeter Medical School, UK

Professor Andrée Le May Chair of NIHR Journals Library Editorial Group (HS&DR, PGfAR, PHR journals)

Dr Martin Ashton-Key Consultant in Public Health Medicine/Consultant Advisor, NETSCC, UK

Professor Matthias Beck Professor of Management, Cork University Business School, Department of Management and Marketing, University College Cork, Ireland

Dr Tessa Crilly Director, Crystal Blue Consulting Ltd, UK

Dr Eugenia Cronin Senior Scientific Advisor, Wessex Institute, UK

Dr Peter Davidson Director of the NIHR Dissemination Centre, University of Southampton, UK

Ms Tara Lamont Scientific Advisor, NETSCC, UK

Dr Catriona McDaid Senior Research Fellow, York Trials Unit, Department of Health Sciences, University of York, UK

Professor William McGuire Professor of Child Health, Hull York Medical School, University of York, UK

Professor Geoffrey Meads Professor of Wellbeing Research, University of Winchester, UK

Professor John Norrie Chair in Medical Statistics, University of Edinburgh, UK

Professor John Powell Consultant Clinical Adviser, National Institute for Health and Care Excellence (NICE), UK

Professor James Raftery Professor of Health Technology Assessment, Wessex Institute, Faculty of Medicine, University of Southampton, UK

Dr Rob Riemsma Reviews Manager, Kleijnen Systematic Reviews Ltd, UK

Professor Helen Roberts Professor of Child Health Research, UCL Great Ormond Street Institute of Child Health, UK

Professor Jonathan Ross Professor of Sexual Health and HIV, University Hospital Birmingham, UK

Professor Helen Snooks Professor of Health Services Research, Institute of Life Science, College of Medicine, Swansea University, UK

Professor Jim Thornton Professor of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, University of Nottingham, UK

Professor Martin Underwood Director, Warwick Clinical Trials Unit, Warwick Medical School, University of Warwick, UK

Please visit the website for a list of editors: www.journalslibrary.nihr.ac.uk/about/editors

Editorial contact: journals.library@nihr.ac.uk