



RESEARCH

INFORMATION

Sit Less, Move More: Improving sedentary behaviour and physical activity in community-living older adults



AIMS

Scotland has an ageing population. Older adults typically spend up to 80% of their waking day sedentary and are less likely than younger adults to be physically active. Sitting for lengthy periods and not doing enough physical activity are associated with poor physical and mental health. Interventions supporting older adults to be more active and sit less are therefore important to improve and/or maintain their health and wellbeing.

The study aimed to:

- co-develop with older adults a self-monitoring and goal setting technology-supported intervention (Sit Less, Move More – SLMM) to help them be more active, break up sitting time, and improve their strength and balance.
- assess if the SLMM intervention is feasible to deliver, acceptable to older adults and shows potential to be effective.



KEY FINDINGS

- Co-development workshops produced a 12-week home-based intervention, including:
 - a pocket-worn device (Activator) and specifically-designed SLMM app for self-monitoring and setting goals to increase physical activity and decrease sedentary behaviour.
 - information materials and support from a trained guide (via two home visits and five phone calls).
- An initial pilot demonstrated low recruitment, the Activator required intensive ongoing technical support following initial training and some participants felt 12 weeks was too long.
- To allow delivery of SLMM during COVID-19, we designed a shorter 10-week 'fully remote' SLMM intervention, with a pedometer (replacing the Activator) to self-monitor physical activity, and seven phone calls from a guide. This was feasible to deliver, acceptable to participants, and produced positive outcomes (including objective and self-reported physical activity and sedentary behaviour) post-programme.





WHAT DID THE STUDY INVOLVE?

The study involved three phases:

Phase 1: Five half-day co-development workshops were held with 6-8 older adults recruited by staff at Glasgow Housing Association (GHA) (Jan-July 2018) to: 1) test and optimize the Activator and app to support self-monitoring of daily steps and non-sitting time; 2) test and adapt other intervention components; and 3) develop recruitment strategies.

Phase 2: An initial pilot trial (Sept 2018-Mar 2019) aimed to: 1) test recruitment through GHA and local GP practices; and 2) test and refine the SLMM intervention format and components.

Phase 3: A mixed-method feasibility randomized trial (Dec 2020-Oct 2021) aimed to investigate the feasibility, acceptability and potential effectiveness of the optimized SLMM intervention in improving self-reported (via questionnaire) physical activity, sedentary behaviour, perceived health, wellbeing and social support post-programme and at 26-weeks. Following COVID-19 adaptations (see Pilot trial, below), we also explored the feasibility of using the pocket-worn Activator to provide objective measurement of physical activity and sedentary behaviour.



WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

Phase 1: Co-development workshops

The workshops produced a 12-week SLMM intervention designed to be delivered individually to older adults living independently in their own homes. This included:

- A handbook to support participants to first, increase their daily step counts, then increase their 'on your feet' time, with information and activities on:
 - the benefits of being more active (including strength and balance exercises) and sitting less.
 - finding a balance between being active and sitting that works for you.
 - social support (including social network mapping) for sitting less and moving more.
 - dealing with setbacks and maintaining change.
 - self-monitoring/goal setting.
- The Activator device (Figure 1a) and associated visual display Smartphone/tablet app (Figure 1b) to support participants to self-monitor their daily steps and upright ('On your feet') time, and set goals to increase these.
- SLMM guide training materials.

1a



1b



Self-monitoring screen



Goal screen



History screens including visualisation of goal achievement



The Activator and associated self-monitoring and goal-setting app



WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

Phase 2: Pilot study

The pilot trial aimed to recruit 30 independently-living older adults aged 65 and over from GHA, and 30 from local GP practices.

- Intensive strategies (including 785 letters and 18 information sessions for GHA residents, and 150 letters sent to patients at three GP practices) only succeeded in recruiting 15 GHA residents and no GP patients (25% of our target).
- Participant interviews, guide feedback and researcher fieldnotes suggested the intervention was broadly acceptable. However, some people felt 12 weeks was too long.
- A number of participants struggled to link their Activator to the self-monitoring/goal setting app and needed multiple support visits from the researcher to help them do this.

The feedback led to SLMM being shortened to 10 weeks, with an optional week 12 'check in'. Further adaptations to the intervention and outcome measurements to support remote intervention delivery and data collection during COVID-19 included:

- the guides providing support via seven phone calls – at weeks 1, 2, 3, 5, 6, 8 and 10 (i.e., no home visits), with an optional week 12 phone call.
- participants receiving a pedometer (instead of the Activator) to self-monitor their daily steps – to remove the need for in-person technical support.
- the Activator (without the app) being used as a research tool to objectively measure physical activity and sedentary behaviour. This removed the need for in-person support to attach an activity monitor.
- recruitment broadened to include people aged 60 and over, and advertising through Facebook, the Scottish Walking Charity, Paths for All, and Age Scotland, as well as GHA.

Phase 3: Feasibility study

Was the SLMM intervention feasible? **Answer – Yes**

The feasibility trial achieved its recruitment target (N=60; 29 intervention group, 31 comparison group). Participants were aged 68 on average (range 61-82 years), 82% women, 52% from areas of mid-high socio-economic deprivation¹, and 72% retired. All were of white ethnicity, and 77% reported a long-standing illness or disability. Following training, guides were able to deliver all phone sessions.

Was the SLMM intervention acceptable to participants? **Answer – Yes**

In the intervention group, 24/29 (82.8%) completed the intervention (as defined by completing the week 10 phone session), and a further participant completed the week 8 phone session. Twenty-one of those completing week 10 opted to have a week 12 phone call with their guide.

In post-programme interviews (conducted with 15 intervention completers), participants described how they enjoyed taking part in the SLMM sessions, and found the intervention engaging, and simple and easy to follow. In addition, as one woman explained, the phone-based delivery format made SLMM more accessible to people like her who did not live in towns and cities, than if the sessions had been delivered in person:

...I wouldn't have been chosen [to take part in SLMM] probably because nobody's going to come to the [remote rural location] to visit me. F6, Mid 60s

¹Scottish Index of Multiple Deprivation



WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

Did SLMM show potential to be effective? Answer – Yes

Objectively-measured physical activity and sedentary behaviour

52/60 participants provided valid (at least 4 days) Activator data at baseline, 40/60 post-programme and 37/60 at 26 weeks.

After completing SLMM, the intervention group increased daily stepping time from 1.47 to 1.85 hours ($p=.046$), upright time from 4.92 to 6.04 hours ($p=.022$) and sit to stand transitions from 41-51 ($p=.034$). They also showed non-significant improvements in daily steps (5456-6798) and sitting time (9.76-9.27 hours). The comparison group showed a significant increase in daily upright time (4.84-5.20 hours, $p=.038$), and non-significant changes in other outcomes. The only significant improvement maintained at 26 weeks was upright time in the intervention group (5.70 hours, $p=.001$).

These findings suggest the Activator can be used for the objective measurement of physical activity and sedentary behaviour.

Self-report measures

All participants completed phone-administered baseline questionnaires; 49/60 (24 intervention group, 25 comparison group) completed post-programme questionnaires; and 48/60 (22 intervention group, 26 comparison group) completed 26-week questionnaires.

Self-reported physical activity²

The intervention group reported a significant increase in walking post-programme (809-2030 METmin/week, $p=.004$) that compared favourably to the comparison group (693-726 METmin/week, non-significant). There were no other significant changes in self-reported physical activity in either group post-programme or at 26 weeks.

The intervention group also reported increases in the number of days per week they did strength and balance exercises, from 1.41³ to 3.38 (strength)/4.09 (balance) post-programme (comparison group: 1.26-2.72/2.64) and 3.18/3.00 at 26 weeks (comparison group: 2.36/2.04).

Self-reported sedentary behaviour

Both groups showed significant improvements in the perceived proportion of their day spent sitting⁴ post-programme (intervention group 6.37-4.68, $p=.007$; comparison group 6.75-5.25, $p<.001$) and at 26 weeks (intervention group 4.40, $p<.001$; comparison group 5.86, $p=.017$).

The intervention group (but not the comparison group) reported a significant post-programme decrease in total daily sitting time⁵ (654-542 minutes, $p=.026$). This appeared due to less time spent watching TV and on the computer. The improvement was not maintained at 26 weeks.

Other measures

The intervention group also reported significant improvements in wellbeing⁶ post-programme and at 26 weeks (the comparison group only reported significant improvements in wellbeing at 26 weeks), and in support for physical activity from friends⁷ at 26 weeks. Neither group reported any improvement in perceived health⁸.

²International Physical Activity Questionnaire Long Form; ³ Strength and balance exercises were reported together at baseline and separately at both follow ups; ⁴Sedentary Behaviour Visual Analogue Scale (range 1-10); ⁵Measuring Older Adults Sedentary Time Scale; ⁶Warwick-Edinburgh Mental Well-Being Scale; ⁷Social Support for Exercise Scale; ⁸EQ-5D-5L Visual Analogue Scale





WHAT IMPACT COULD THE FINDINGS HAVE?

Public: The SLMM intervention shows potential to support older adults to make positive changes to their physical activity (walking, and strength and balance exercises), sedentary behaviour and wellbeing, at least in the short term.

Policy and practice: Phone-based delivery can increase accessibility to older adults (including those living in remote areas), and train-the-trainer models could be explored and developed to cascade SLMM through organisations working with older people.

Research: The pocket-based Activator shows promise as an easy-to-use device to collect objective physical activity and sedentary behaviour data from older adults.



HOW WILL THE OUTCOMES BE DISSEMINATED?

Conferences: The workshop findings have been presented at two national and international conferences (UK Society for Behavioural Medicine 2018 and International Society for Behavioural Nutrition and Physical Activity 2019). The feasibility study findings are being presented at the International Society for Behavioural Nutrition and Physical Activity 2022.

Journal article: The intervention development and feasibility study findings are being written up for publication in BMC Public Health.

Public and practitioners: The outcomes will be shared with over 300 members of Paths for All's Scottish Health Walk Network.



CONCLUSION

The SLMM intervention provides a novel approach in supporting older adults to achieve all components of the physical activity guidelines. Importantly, it can be delivered at home with telephone support from trained guides and minimal specialist equipment.

Funding should be sought for a larger scale evaluation to find out if the results can be replicated more widely when COVID-19 restrictions are eased, and to determine the cost-effectiveness of the SLMM intervention. Future research should also explore how to widen engagement among minority ethnic groups.



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Additional Information

The project received £314,822 from the Chief Scientist Office and ran from 1st November 2017 to 30th November 2021.

