



Research

An app with remote support achieves better adherence to home exercise programs than paper handouts in people with musculoskeletal conditions: a randomised trial

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KEY WORDS

Patient compliance
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Exercise therapy
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ABSTRACT

Question: Do people with musculoskeletal conditions better adhere to their home exercise programs when these are provided to them on an app with remote support compared to paper handouts? **Design:** Randomised, parallel-group trial with intention-to-treat analysis. **Participants:** Eighty participants with upper or lower limb musculoskeletal conditions were recruited to the trial. Each participant was prescribed a 4-week home exercise program by a physiotherapist at a tertiary teaching hospital in Australia. Participants were randomly assigned via a computer-generated concealed block randomisation procedure to either intervention (n = 40) or control (n = 40) groups. **Intervention:** Participants in the intervention group received their home exercise programs on an app linked to the freely available website www.physiotherapyexercises.com. They also received supplementary phone calls and motivational text messages. Participants in the control group received their home exercise programs as a paper handout. **Outcome measures:** Blinded assessors collected outcome measures at baseline and 4 weeks. The primary outcome was self-reported exercise adherence. There were five secondary outcomes, which captured functional performance, disability, patient satisfaction, perceptions of treatment effectiveness, and different aspects of adherence. **Results:** Outcomes were available on 77 participants. The mean between-group difference for self-reported exercise adherence at 4 weeks was 1.3/11 points (95% CI 0.2 to 2.3), favouring the intervention group. The mean between-group difference for function was 0.9/11 points (95% CI 0.1 to 1.7) on the Patient-Specific Functional Scale, also favouring the intervention group. There were no significant between-group differences for the remaining outcomes. **Conclusion:** People with musculoskeletal conditions adhere better to their home exercise programs when the programs are provided on an app with remote support compared to paper handouts; however, the clinical importance of this added adherence is unclear. **Trial registration:** ACTRN12616000066482. [Lambert TE, Harvey LA, Avdalis C, Chen LW, Jeyalingam S, Pratt CA, Tatum HJ, Bowden JL, Lucas BR (2017) An app with remote support achieves better adherence to home exercise programs than paper handouts in people with musculoskeletal conditions: a randomised trial. *Journal of Physiotherapy* XX: XX-XX]

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Introduction

Home exercise programs (HEPs) are an integral component of treatment for many different types of musculoskeletal conditions, and are typically designed by physiotherapists to suit the individual needs of patients during face-to-face sessions.^{1,2} These HEPs are usually provided to patients on a paper handout.³ The prescription of HEPs encourages patients to take responsibility for their rehabilitation and self-manage their conditions over the long term.⁴ Adherence to these programs has been directly associated with improved patient outcomes;^{5,6} however, reports indicate that up to 70% of patients do not perform HEPs as prescribed and that adherence tends to decline over time.⁶

Non-adherence to HEPs can be due to patient-related factors including low motivation, pain, poor self-efficacy, limited past experience with exercise, and reduced social support. Also, the benefits of HEPs may not be immediately recognised by patients.⁷ Some researchers suggest that adherence to HEPs could be improved if physiotherapists increased their amount of face-to-face time with patients,^{8,9} but this is costly and rarely feasible given finite resources. Therefore, other solutions to improve adherence and better utilise physiotherapy resources are needed.

Whilst the research to date has addressed many patient-related factors, little attention has been directed at evaluating different modes of delivering HEPs and how this affects adherence. Those who have investigated the influence of mode of delivery on adherence

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have reported mixed results. For example, studies examining the use of video or audio tapes to deliver HEPs have not demonstrated any added benefit over paper handouts or brochures.^{10–12} More recently, a randomised, controlled trial in an outpatient stroke population compared smart device technology (video and built-in reminder functions) to paper handouts, and also failed to demonstrate any difference in adherence.¹³ In contrast, a randomised, controlled trial recently reported greater adherence to HEPs delivered through mobile phones with an internet-based self-monitoring system in patients with haemophilia-related knee dysfunction.¹⁴

Given that more than 85% of Australians are internet users, with an estimated 32 million mobile phone subscriptions,¹⁵ apps are potentially highly feasible for delivering and encouraging adherence to HEPs. Promising results have already been reported with the use of apps to improve adherence and outcomes in other health areas, such as weight loss¹⁶ and diabetic management.¹⁷ There could be several reasons for this success, including the potential for apps to send alerts, motivating messages or reminders.¹⁸ In addition, it may be more convenient for patients to access their HEPs via a mobile phone or device rather than a paper handout. A recent systematic review suggested that the ability of apps to include self-monitoring systems, for example an electronic log of completed exercises, could also increase adherence in people with chronic musculoskeletal pain.¹⁹ Furthermore, patients' adherence could be positively influenced by their knowledge that their physiotherapists can remotely monitor their adherence and provide feedback via an app. Therefore, this study aimed to investigate the potential of an app to promote adherence to HEPs in an effort to optimise patient outcomes.

Therefore, the research questions for this randomised, parallel-group trial were:

1. Do people with musculoskeletal conditions better adhere to their HEPs when delivered through an app with remote support compared to paper handouts?

2. Do people with musculoskeletal conditions report better function, more improvement in their condition, less disability and greater satisfaction with healthcare service delivery when their HEPs are delivered through an app with remote support compared to paper handouts?

Method

Design

A randomised, parallel group trial was undertaken in 80 people with upper or lower limb musculoskeletal conditions (Figure 1). The study commenced on 25 February 2016 and finished on 24 February 2017. Participants were randomly assigned via a computer-generated, concealed, fixed block randomisation procedure to either intervention (n = 40) or control (n = 40) groups. Intervention group participants received their 4-week HEPs on an app with remote support, and control group participants received their HEPs on paper handouts. Data were obtained prior to randomisation by treating physiotherapists, and then 4 weeks later by blinded assessors.

Participants, therapists and centres

Participants were recruited from patients receiving physiotherapy for musculoskeletal conditions at Royal North Shore Hospital, Sydney, Australia. Patients were initially screened by one of nine experienced physiotherapists working in either the musculoskeletal outpatients, plaster room or hand therapy departments. They were included if they had an upper or lower limb injury or condition, had been provided with 4 weeks of home exercises by a physiotherapist and were expected to complete these exercises at least three times per week. Patients were only eligible for inclusion

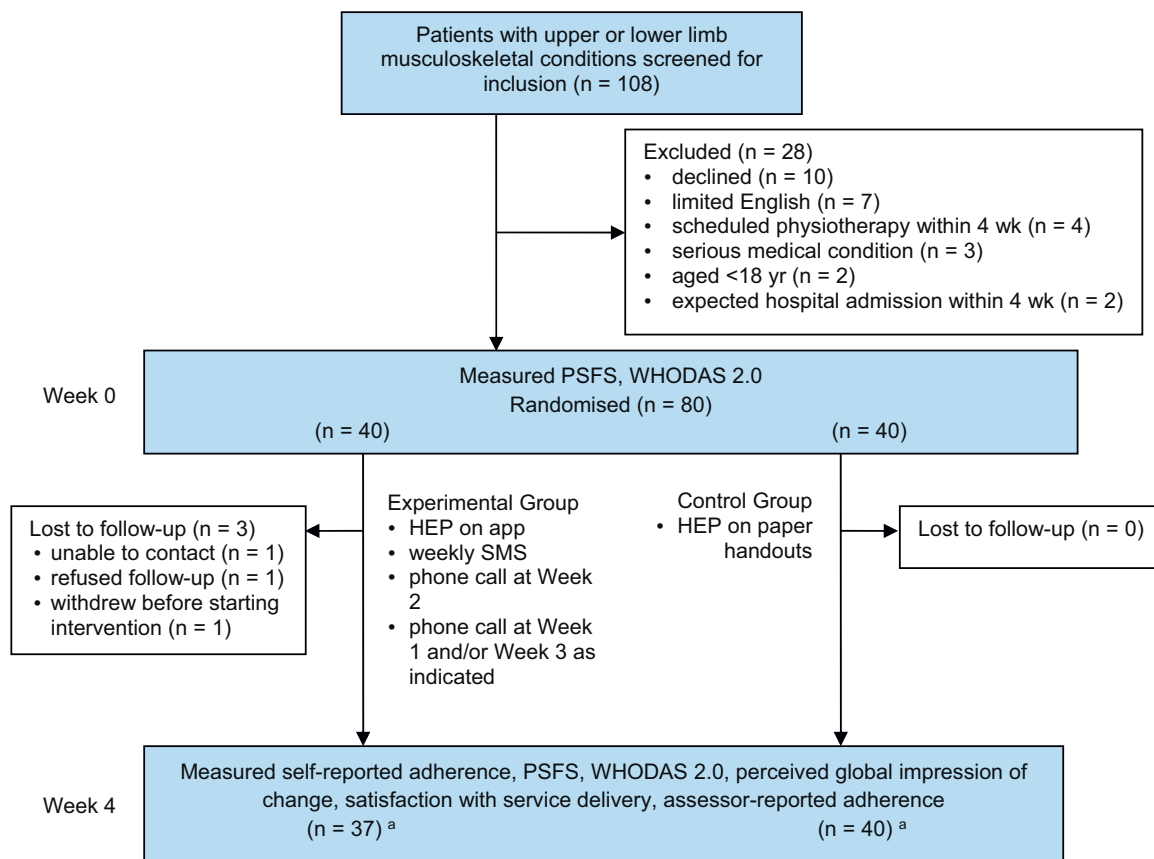


Figure 1. Design and flow of participants through the trial.

HEP = home exercise program, PSFS = Patient-Specific Functional Scale, WHODAS 2.0 = World Health Organization Disability Assessment Schedule 2.0.

^a Indicates number of participants analysed for the primary outcome. Some data were missing for some secondary outcomes; see Tables 2 to 4 for details.

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