Physical Activity At Home

Long-term effectiveness of a community group exercise versus physiotherapist-led home-based physical activity program in middle-aged adults.

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Abstract

Background
It is well recognised that the adoption and longer-term adherence to physical activity (PA) by adults to reduce the risk of chronic disease is a challenge. Interventions, such as group and home-based physical activity programs, have been widely reported. However, few studies have directly compared these interventions to determine their effectiveness, in terms of health benefits, long-term physical activity adherence, and cost. Some evidence suggests that home-based physical activity programs are preferred by the majority of middle-aged adults, and provide better long-term physical activity adherence. Physiotherapists may also be useful in increasing physical activity adherence, but research on their impact is limited.

Methods
Using a pragmatic, mixed methods, quasi-experimental design, sedentary, community-dwelling, healthy 50-65 year olds were recruited to a non-randomized 6-month community group exercise program (G, n=93), or a physiotherapist-led home-based physical activity program (HB, n=65), targeting those not interested in, or unable to attend, a group exercise program. An 18-month no-intervention follow-up period was included, with outcome measures collected at baseline, 6, 12, 18 and 24-months. Outcomes measures comprised of ‘sufficient’ physical activity (Active Australia Survey (AAS)), minutes of moderate-vigorous physical activity (MVPA, ActiGraph GT1M), physical activity adherence (PA diaries), aerobic capacity (2-minute step-test), quality of life (SF-12v2), blood pressure, waist circumference, waist-to-hip ratio (WHR), and body mass index. Qualitative data was collected via focus groups with sub-groups of participants (group attendees (n=14), group non-attendees (n=9), and home-based (n=14)), and exit telephone calls (n=37) at the end of the intervention period. A validation of subjective physical activity measures was conducted over 7-days, with 76 participants (HB, n=39; G, n=37) wearing an ActiGraph GT1M accelerometer, completing the AAS and a daily PA diary, towards the end of the intervention period. A cost analysis (cost and effect (benefit)) was carried out, collecting direct costs of delivering the interventions prospectively. Mean differences in costs and effects between interventions were calculated at 6 and 24-months.
Results
Home-based participants were more likely to be younger, working full-time and not in a relationship (p<0.05). Thirty-three percent of the group participants attended ≥ 70% of group exercise sessions. Ninety percent of home-based participants received ≥ 4 of the planned 6 telephone support calls. At 6-months, intention-to-treat analysis found both interventions increased the number of participants achieving self-reported ‘sufficient’ physical activity (p≤0.001), and decreased waist circumference (p<0.001) and WHR (p<0.05). At 2-years, these improvements were maintained for ‘sufficient’ physical activity (p≤0.001), and waist circumference (p<0.001), with no difference between interventions. Home-based participants reported fewer barriers to the program and a number of enablers, including the flexibility of the program and physiotherapist instruction. Self-efficacy, work and carer commitments were major themes identified for all participants, and all participants preferred a variety of physical activity formats. Physical activity diaries for group participants had no significant correlations with the ActiGraph data, while home-based participants had fair-to-good agreement (r=0.39–0.68, p<0.05). The AAS had good correlations with the ActiGraph data for both interventions (MVPA: HB r=0.56, p≤0.001; G r=0.49, p<0.01). At 2-years, the home-based program was less costly (HB AUS$47 vs. G $84 per participant), but less effective in achieving increased physical activity and decreased waist circumference.

Conclusions
The physiotherapist-led home-based physical activity program may be a low cost alternative to increase physical activity levels in the long-term, particularly for sedentary middle-aged adults not interested in, or unable to attend, a group exercise program. The home-based program appears to have increased the adoption of physical activity and adherence to the physical activity program requirements; although a variety of physical activity formats are indicated. When comparing physical activity formats, self-report physical activity data should be interpreted cautiously, with the AAS the preferred self-report tool. The evidence indicates that the physiotherapist-led home-based physical activity program has been successful, and could be an alternative option for physical activity program delivery in a number of different settings.

Clinical Trial Registration number
Australian New Zealand Clinical Trials Registry (ANZCTR), ACTRN12611000890932.
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Definitions

Sedentary

Sedentary is defined in this thesis as no participation in regular moderate or vigorous exercise for 30 minutes 2 or more times a week for at least 6-months (Stewart et al. 2001; Wilbur et al. 2008). Other studies have used a much broader inclusion criteria for physical activity, with eligible participants needing to complete less than 150 minutes of moderate intensity physical activity per week (Jancey et al. 2006; Stevens et al. 2008). Targeting sedentary individuals is particularly important, as studies have shown that sedentary individuals have the most to gain, with any activity better than none (Warburton et al. 2006).

Physical activity versus exercise

Caspersen et al (1985) defines physical activity as any bodily movement produced by skeletal muscles that results in energy expenditure. Exercise is a subset of physical activity. Exercise is physical activity that is planned, structured, repetitive, and purposive, aiming to improve or maintain one or more components of physical fitness (Caspersen et al. 1985). As such, the group exercise program was compared to the physiotherapist-led home-based physical activity program to determine the effectiveness of each intervention in increasing physical activity levels of sedentary middle-aged adults.

Sufficient Physical Activity

The World Health Organisation recommends at least 30 minutes of regular, moderate intensity physical activity on most days to reduce the risk of disease and injury (World Health Organization 2004). Sufficient physical activity to gain the health benefits was therefore defined as 30 minutes of moderate intensity physical activity on at least 5 days per week. Thirty minutes could be accumulated in 10 minute bouts of physical activity per day (Department of Health and Ageing 2005).

Group Physical Activity Program

In this thesis group physical activity programs are defined as a group of individuals participating in a supervised and structured physical activity program. For example, group sessions will be instructor-led, held the same day and time every week. Primarily group
physical activity programs are centre-based but they can also be carried out in various other settings, for example, parks.

**Home-based Physical Activity Program**

Home-based physical activity programs are defined as being unsupervised, unstructured or lifestyle physical activity programs. Physical activity will primarily be performed independently although this can be undertaken in a variety of settings, for example, during transit, within the home, garden, gym, and can be carried out with others, such as with a friend.

**PAAH physiotherapist-led home-based physical activity program**

An initial physiotherapy home visit was conducted using motivational interviewing to devise an individual physical activity program. A physiotherapist discussed type, frequency, intensity, duration, benefits, barriers, goals, self-monitoring and progression of physical activity with participants, aiming to achieve 30 minutes of moderate intensity physical activity most days of the week. This was followed by approximately 6 phone calls using motivational interviewing to offer advice and support over the 6-month intervention period. Home-based participants were encouraged to increase their physical activity levels in a number of different settings, for example, during transit, within the home, garden, gym, and could be carried out with others, such as with a friend.

**PAAH group exercise program**

The group exercise program was conducted during business hours replicating similar programs and times offered in this community setting. The sessions were run by a YMCA fitness instructor at the YMCA once a week, for 60 minutes, over 6 months. The exercise program involved upper and lower body strengthening exercises, gross motor skill training and aerobic fitness training. The exercise specifics were at the discretion of the YMCA fitness instructor. Participants were encouraged to increase their physical activity slowly and gradually in whichever way they preferred outside of the group sessions by the YMCA fitness instructors, aiming to achieve 30 minutes of moderate intensity physical activity most days of the week. An individual home-based exercise program was not specifically designed for this group.
Publications and Presentations

Papers published / in press


Paper submitted and accepted for review

Conference presentations

Australian Cardiovascular Health and Rehabilitation Association (ACRA) Conference, Brisbane, Queensland 2012. ‘Are groups the panacea we think they are? Recruitment and attrition rates of two physical activity interventions’ (oral).


Be Active 2012, 4th International Congress on Physical Activity and Public Health, Sydney, New South Wales 2012. ‘Validating physical activity measures in middle-aged adults completing a group or home-based physical activity program’ (poster).

American College of Sports Medicine Annual Meeting and 4th World Congress on Exercise is Medicine, Indianapolis, Indiana, USA 2013. ‘Long-term effects of a community group versus physiotherapist-led home-based physical activity program’ (poster).
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