A home-based program of simple quadriceps exercises reduces knee pain and improves knee function in overweight people with knee pain

Synopsis


**Question:** Does a program of quadriceps exercises or dietary advice, or both, reduce knee pain and improve knee function in people living in the community with knee pain? **Design:** Factorial, randomised, controlled trial. **Setting:** Five general practices in the United Kingdom with interventions delivered through home visits. **Participants:** Community dwellers aged at least 45 years, who were overweight or obese (BMI ≥ 28) and complained of knee pain on most days of the past month. Randomisation of 389 participants allotted 82 to the quadriceps exercise group, 122 to the dietary advice group, 109 to the quadriceps exercise and dietary advice group, and 76 to a control group. **Interventions:** The exercise groups were taught the exercises at home by a dietitian and received up to 6 further home visits over 24 months. Exercise participants were asked to complete ≥ 2 exercises a day, with 5 to 20 repetitions of each exercise. The exercises progressed from quadriceps setting exercises, to exercises with elasticised bands, to functional activities such as stepping up and down off a step. The dietary groups received individualised advice to reduce weight, newsletters with recipe ideas, and one home visit per month over 24 months. The control group received an advice leaflet. **Outcome measures:** The primary outcome was pain reduction by ≥ 30% on the pain subscale of the Western Ontario McMaster University Osteoarthritis Index (WOMAC) osteoarthritis index at 24 months. Secondary outcome measures were change in WOMAC pain, stiffness, and physical function subscales, hospital anxiety and depression rating scale, and the bodily pain and physical function domains of the Short Form 36 (SF-36). **Results:** 289 (74%) participants completed the study. At 24 months, those in the exercise groups were more likely to experience ≥ 30% reduction in pain compared to the non-exercise groups (relative risk 1.36, 95% CI 1.05 to 1.76) with number needed to treat of 9 (95% CI 5 to 55). Compared to the non-exercise groups the exercise groups showed improvement in WOMAC physical function of –3.64 units (95% CI –6.01 to –1.27), WOMAC stiffness (–0.35 units, 95% CI –0.66 to –0.03), and improvements in the SF-36 subscales of bodily pain and physical function. The dietary advice groups lost weight (2.95 kg, 95% CI 1.44 to 4.46 kg) and reduced depression at 24 months compared to the non-dietary groups, but showed no evidence of an effect on any other outcomes. **Conclusion:** A 2-year home-based quadriceps exercise program reduced knee pain and increased knee function in overweight and obese people with knee pain. The effect size was moderate. Dietary advice resulted in a modest weight loss that did not change pain or function, but did reduce depression.

Commentary

Knee pain due to osteoarthritis is common (Peat et al 2001) and will increase in prevalence as the population ages (Wilmoth 2000) and as obesity levels rise (James 2008). Thus this trial addresses an important problem. Most people are managed in primary care and the most recent UK guidance recommends that all patients receive advice about weight management and exercise (NICE 2008).

Overall, the design, conduct, and analysis of this trial are of high quality. The evaluation of the combined treatment is clinically sensible and a key strength of the trial is the 2-year follow-up. Two areas deserve consideration. The first is the way in which the interventions were delivered. Both the exercise and dietary interventions were delivered through home visits: those receiving only the exercise intervention had up to 7 home visits by the dietitian over 2 years, supplemented by telephone calls between visits (up to 15 ‘contacts’ with a health professional), and those receiving the dietary intervention had monthly home visits over 2 years (up to 24 ‘contacts’ with a health professional). It is difficult to view the interventions as ‘self-managed’ given that over 3700 home visits took place. The intensity of these interventions is not usual practice in the UK (Holden et al 2008), which raises questions about whether health care policy makers and those who purchase services will view the moderate effects of the exercise intervention in this trial as worth the high number of treatment ‘sessions/contacts’. The companion cost-effectiveness paper (Barton et al 2009) reports that, although the exercise and dietary interventions were more effective, they were not cost-effective. Future research should study less intensive interventions in primary care that nevertheless provide some ongoing support and review by health professionals.

The second key issue relates to exercise adherence. The exercise program provided clinically beneficial outcomes for pain and function, but only 45% adhered ‘highly’ to the recommended program and there were more withdrawals from the exercise intervention groups. Undoubtedly, future research needs to investigate how to support adults with knee pain to engage in exercise programs that they feel willing and able to continue over the long-term, helping them translate the improvements in knee pain and function into overall lifestyle change and wider health benefits.

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**References**


