Optimising recruitment of older people into physical activity study


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Optimising recruitment into a study of physical activity in older people: a randomised controlled trial of different approaches

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Abstract

Background: physical activity studies in older people often have poor recruitment. Including a questionnaire with the invitation would provide information about non-participants and selection bias, but could reduce recruitment. Telephone contact might encourage participation.

Objective: to test the effects of different strategies for recruitment into a study of physical activity in older people.

Design: factorial randomised controlled trial. Randomisation by household into four groups: telephone contact plus questionnaire, telephone contact only, questionnaire only, neither.

Setting: primary care, Oxfordshire, United Kingdom.

Participants: 560 patients ≥ 65 years randomly selected after exclusions.

Interventions: questionnaire to assess health, functional ability and physical activity. Telephone contact by the research nurse a week after sending study information.

Main Outcome Measure: recruitment into physical activity study.

Results: telephone contact increased recruitment: contact 47.9% (134/280), no contact 37.9% (106/280), difference (adjusted for the clustering effect of household) 10.0% (95% CI 0.2–19.8). Questionnaire inclusion did not significantly reduce recruitment: no questionnaire 44.3% (124/280) questionnaire 41.4% (116/280) difference −2.9% (95% CI −12.7–7.0).

Conclusions: telephone contact significantly increased recruitment and should be considered in studies where recruitment may be low. While inclusion of a questionnaire provided valuable information on non-participants and did not significantly reduce recruitment, an adverse recruitment effect could not be excluded.

Keywords: recruitment, response rate, questionnaires, randomised controlled trial, physical activity, older people, elderly
T. J. Harris et al.

Introduction
Studies of physical activity among older primary care patients report low recruitment, both for questionnaire surveys (46% [1], 57% [2]) and more markedly for intervention studies (6% [3], 26% [4], 32% [5], 35% [2]) leading to potential selection bias. There is a lack of information about non-responders’ physical activity levels, but one study found that higher activity levels were associated with increased recruitment [4]. Tai et al. suggest that selection bias is a particular problem for recruiting older people into physical activity studies. They suggest refinement of recruitment methods, through feasibility studies to minimise this bias [6] and recommend recruitment through community-based sampling rather than targeting primary care attenders [7].

Inclusion of a questionnaire assessing self-reported physical activity, health and functional ability, with the study invitation, would provide important generalisability information about those not participating in the physical activity study, but it might reduce study recruitment. Systematic reviews have shown that longer questionnaires reduce survey response rates [8, 9], but have not addressed whether the actual inclusion of a questionnaire with study information has an effect on recruitment. Similarly, although telephone contact may improve response to postal questionnaires in health research [9], evidence is lacking about whether telephone contact can increase recruitment to a study. This pilot’s objective was to test the effects of different recruitment strategies for a community-based physical activity study in older people (questionnaire versus no questionnaire, telephone versus no telephone contact) by randomisation using a factorial approach.

Methods
Target population
The target population was community-dwelling older people aged ≥ 65 years, able to walk outside the home and registered with a six partner general practice (primary health care centre) in semi-rural Oxfordshire, United Kingdom.

Exclusion criteria
Those living in care homes, those with dementia, terminal illness, poorly controlled cardiac failure or unstable angina and those housebound due to disability were excluded by computer record search and by general practitioner and district nurse examination of patient lists. Patients undergoing active follow-up in another research study at the practice (investigating the effect of fish oils on cognitive function) were also excluded. (This study required people to be aged 70–79 and not diagnosed with dementia or diabetes.)

Sample size and power
A total of 1,529 patients aged ≥ 65 years were registered with the practice. We anticipated approximately 300 exclusions (leaving 1,200 eligible patients) and a baseline recruitment rate of approximately 40% based on previous studies. The study was powered to detect a difference in response rate of 13% points (40% versus 53%) between the two groups (no telephone contact versus telephone contact) at 80% power and \( p = 0.05 \), using a continuity corrected chi-square test. (A difference of 13% was a compromise between our preferred difference of 10% and what the study funders were prepared to support.) This would require 250 per group if there was no clustering by household. To allow for what we anticipated would be a small loss of power due to clustering we extended recruitment to 280 per group (half of whom received a questionnaire, half not). There was similar power for detecting a difference of 13% points between the 280 receiving the questionnaire and the 280 not. Thus 140 individuals were invited in each of four ways using a factorial design (i.e. a total of 560 participants).

Randomisation
Randomisation was performed by a statistician (IC) blind to participant details, except an anonymous address coding. Eligible patients were randomised at a household level (using a random number sequence) to avoid contamination of partners receiving different methods and written material. The sequence selected households until exactly 140 individuals were selected for each of the four groups: (i) no telephone call, no questionnaire; (ii) no telephone call, questionnaire; (iii) telephone call, no questionnaire; (iv) telephone call, questionnaire.

Study procedure
All 560 randomised patients received a personalised letter and patient information sheet inviting them to take part in a physical activity study measuring customary physical activity levels objectively for a 7-day period using motion sensors (accelerometers and pedometers). Study invitations were sent out over a 20-week period from September 2006 (28 invitations weekly, seven from each group) to allow the research nurse to recruit participants into the physical activity study.

Questionnaire intervention
A random half (280 participants) also received a 12-page questionnaire with their study information, asking about physical health, mood, ability to perform daily living activities and self-reported physical activity. Individuals were encouraged to return the questionnaire in an SAE, whether or not they were participating in the physical activity study.

Telephone contact intervention
In those randomised to no telephone contact, the study information included a response slip to indicate whether they wished to participate, and to be returned in an SAE. After 2–3 weeks, non-responders in the no telephone contact group were sent one further reminder letter and slip. In those randomised to telephone contact, the study information
Optimising recruitment of older people into physical activity study

Informed them of the name of the research nurse who would telephone them and included a slip to return in an SAE or practice contact number to call if they preferred not to be contacted. Those who responded in this way were excluded from telephone contact. The research nurse telephoned the other individuals approximately 1 week after the study information was sent out. Up to four attempts at telephoning were made on different days and at different times; a record was kept of whether telephone contact was made. A telephone script (approved by the ethics committee) (see Appendices 1 and 2 in the supplementary data in Age and Ageing online) was used both to ensure consistency and that older people did not feel pressurised to participate.

Blinding
Although participants were aware of their group status (i.e. whether or not they received a telephone call or a questionnaire), they were unaware of the other groups’ status and that recruitment into the study was being monitored on the basis of this, as part of a randomised controlled trial. It was impractical for the research nurse administering the interventions (posting out questionnaires and contacting people by telephone) and assessing the outcome (recruitment into physical activity study) to be blinded to their group status.

Main outcome measures
Among the invited, the percentage of those who participated in the accelerometer study was the main outcome. To be counted as a positive response, individuals had to attend the appointment to be given their accelerometer. The few participants who made an initial appointment but did not attend were counted as non-responders. All those who attended for the initial appointment returned 1 week later, having worn the accelerometer.

Analysis
The proportion of participants recruited into the study was calculated for each of the four study groups. The difference in proportions was calculated for each of the interventions (questionnaire versus no questionnaire and telephone contact versus no telephone contact) and 95% confidence intervals for the differences were estimated, adjusting the standard errors for the effect of randomisation being clustered by household. This was done using STATA 9 [10] procedure binreg (binary regression) with the identity link and the cluster option to produce robust standard errors which were adjusted for the clustering effect of household. The results are also presented as odds ratios (ORs) using logistic regression, fitted using the same procedure binreg, but with the logit link and the cluster option.

All those allocated to the questionnaire intervention received it. Many allocated to the telephone contact intervention were not telephoned (either they returned a slip saying they did not want to be telephoned, or telephone contact could not be made). Analysis was by intention to telephone. The study was not powered to look for the effect of possible interactions between groups, so this was not tested for.

Ethics committee approval
Given by Oxfordshire RECA (reference no. 06/Q1604/94).

Results
Exclusions
Of the 1,529 patients aged ≥65 years registered with the practice, 273 (17.9%) were excluded. See Figure 1 for details. Where several reasons for exclusion were present (e.g. dementia and housebound), they were recorded only under the first category.

Flow of participants
Figure 1 is the CONSORT Diagram, showing participant flow through each stage of the trial. All those allocated to the questionnaire intervention received the questionnaire. Only 172/280 (61.4%) of those allocated to telephone intervention were telephoned. Among the 280 participants, 108(38.6%) were not telephoned and the reasons were: they informed us they did not want to be contacted (104); there was no telephone number (3); and contact could not be made (1).

Baseline characteristics
See Table 1. The randomisation achieved balanced groups as there were no differences between the groups in participants’ age, the proportion of women or the number of households.

Overall recruitment rate
Table 1 shows that the overall recruitment rate into the physical activity study was 42.9% (240/560).

Telephone intervention
Telephone contact by the research nurse increased the recruitment rate: contact 47.9% (134/280), no contact 37.9% (106/280) and difference 10.0% (95% CI 0.2–19.8) (Table 2). The OR for responding when randomised to telephone contact versus no telephone contact was 1.5 (1.0–2.3) (adjusted for the clustering effect of household).

Table 1 shows that groups 3 and 4 (telephone contact) have a slightly higher proportion of women than groups 1 and 2 (no telephone contact). Even though this difference is not significantly significant (Chi-square = 1.05, P = 0.79), if women were more likely to respond than men, it could explain some of the increased response in these groups. In fact the response rate was higher for men 125/263 (47.5%) than for women 115/297 (38.7%) (P = 0.04). Adjustment for gender made no difference to the OR, which remained 1.5 (1.0–2.3). Of those telephoned by the research nurse 77.9% (134/172) were recruited into the study.
Questionnaire intervention

Including a questionnaire with the study information did not significantly reduce recruitment: no questionnaire 44.3% (124/280), questionnaire 41.4% (116/280) and difference −2.9% (95% CI −12.7–7.0) (Table 2). The OR for responding when randomised to receiving a questionnaire versus no questionnaire was 0.9 (0.6–1.3) (taking into account the clustering effect of household). All of those sent a questionnaire who wished to participate in the study returned the questionnaire (n = 116). Of the 164 older people sent a questionnaire who did not wish to participate in the physical activity study, 76 (46.3%) returned a completed questionnaire. The response rate to the questionnaire survey in those sent one was therefore 192/280 (68.6%).

Discussion

Summary of main findings

Telephone contact by a research nurse increased recruitment into a study of physical activity in older people, difference in
Table 1. Baseline characteristics and recruitment rate for each group

<table>
<thead>
<tr>
<th>Group 1, n = 140 individuals (98 households)</th>
<th>Group 2, n = 140 individuals (101 households)</th>
<th>Group 3, n = 140 individuals (97 households)</th>
<th>Group 4, n = 140 individuals (99 households)</th>
<th>Overall, n = 560 individuals (395 households)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No telephone, no questionnaire</td>
<td>No telephone, questionnaire</td>
<td>Telephone, no questionnaire</td>
<td>Telephone, questionnaire</td>
<td></td>
</tr>
<tr>
<td>Age Mean (95% Confidence Interval)</td>
<td>73.6 (72.4–74.7)</td>
<td>72.8 (71.8–73.7)</td>
<td>73.8 (72.7–74.9)</td>
<td>73.3 (72.8–73.8)</td>
</tr>
<tr>
<td>(Standard error)</td>
<td>(0.58)</td>
<td>(0.49)</td>
<td>(0.57)</td>
<td>(0.26)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number and percentage of women</td>
<td>70 (50.0%)</td>
<td>73 (52.1%)</td>
<td>76 (54.3%)</td>
<td>297 (53.0%)</td>
</tr>
<tr>
<td>Number and percentage recruited into study</td>
<td>59 (42.1%)</td>
<td>47 (33.6%)</td>
<td>65 (46.4%)</td>
<td>240 (42.9%)</td>
</tr>
</tbody>
</table>

*a All percentages are column percentages with number of individuals as the denominator.

Table 2. Effect of interventions on recruitment into study

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Recruitment in intervention group</th>
<th>Recruitment in control group</th>
<th>Difference in recruitment intervention minus control (95% CI) adjusted for the clustering effect of household</th>
<th>OR (95% CI) for recruitment into study adjusted for clustering effect of household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone (groups 3 + 4 versus control (groups 1 + 2)</td>
<td>134/280 (47.9%)</td>
<td>106/280 (37.9%)</td>
<td>10.0% (0.2%–19.8%)</td>
<td>1.5 (1.0–2.3)</td>
</tr>
<tr>
<td>Questionnaire (groups 2 + 4 versus control (groups 1 + 3)</td>
<td>116/280 (41.4%)</td>
<td>124/280 (44.3%)</td>
<td>−2.9% (−12.7–7.0%)</td>
<td>0.9 (0.6–1.3)</td>
</tr>
</tbody>
</table>

Recruitment 10.0% (95% CI 0.2–19.8). This effect occurred despite 39% (108/280) who were randomised to telephone contact not receiving the intervention; the vast majority because they asked not to be telephoned.

Including a questionnaire with the study information did not lead to a significant reduction in recruitment, difference −2.9% (95% CI −12.7–7.0). However, the lower confidence limit shows that a reduction cannot be ruled out. Of those who were sent a questionnaire and were not recruited to the physical activity study, 46.3% (76/164) returned a completed questionnaire. This will be advantageous in comparing physical activity and health information on physical activity study participants and non-participants; these findings will be reported in a future paper.

Study strengths

This study used a community-based sample of older people, rather than targeting primary care attenders. Randomisation and allocation to the two interventions was carried out by a statistician (IC), blind to participant details. Randomisation was performed at household level to ensure that contamination between partners at the same address did not occur. Analysis was adjusted for the clustering effect of household. Although 39% of the telephone intervention group did not receive their intervention, the analysis was performed according to the intention to treat (telephone). Allowing those allocated to the telephone contact intervention an opportunity to opt out, meant that we avoided upsetting people who did not want to be telephoned. Research nurse’s time could also be focused on those who were more likely to want to participate, 78% (134/172) of those telephoned were recruited.

Study weaknesses

Despite efforts outlined in the methods to avoid this, a few invitations may have been sent to ineligible patients or to out-of-date addresses. If this occurred, it would have been done so randomly across the four groups and should not have biased the differences observed between groups. We are confident that the number of patients not receiving invitations was small. Participants were not blind to their intervention status (receipt of a questionnaire and/or a telephone call). However, they were unaware that recruitment to the physical activity study was part of a randomised controlled trial. The research nurse who assessed outcome was not blinded to the participants’ intervention status. However, the outcome measure (recruitment or not into the physical activity study) was objective and not open to interpretation. Although the effect of telephone contact on recruitment was statistically significant, the confidence interval is relatively wide, and
thus the effect may be considerably smaller or greater than our estimate. Similarly, the confidence intervals around the estimate of effect for questionnaire inclusion do not exclude the possibility of an important negative effect on recruitment. We did not collect data on the time spent making telephone calls or posting out questionnaires, as our research nurse multi-tasked and was able to fit these tasks in between baseline and follow-up assessments. We are therefore unable to comment on the cost-effectiveness of the interventions. Although this would have been interesting, it may not have been easily generalisable, as it would have been heavily dependent on the study context and how research nurse’s time was used. Our results apply to older people living in the community, who are able to walk outside the home; they may not apply directly to frail older people and those in care homes.

Comparison with other studies
Response rate
The overall physical activity study recruitment rate was 43% (240/560) and the questionnaire survey response rate was 69% (192/280). The latter compares well to other physical activity surveys among older primary care patients (46% [1], 57% [2]). Our physical activity study involved participants wearing activity monitors and keeping activity logs for 1 week, less commitment than an intervention study, but more than a questionnaire survey; this is reflected in our recruitment rate being higher than physical activity intervention studies in this age group (6% [3], 26% [4], 32% [5], 35% [2]), but lower than the previously mentioned surveys.

Effect of telephone contact on recruitment
The effect of telephone contact on improving postal questionnaire response has been examined in two systematic reviews with opposing conclusions [9, 11]. Edwards et al. found no effect of telephone contact on response rates OR 0.78 (0.32–1.92) [11, 12]. However, only two of the included studies were patient surveys and these were both small. Nakash et al. focused on health research and showed that intensive reminder systems had a significant effect on response compared to usual follow-up OR 3.7 (2.3–6.0) [9]. However, only one small study (n = 143) directly compared telephone and postal contact (and showed phone contact increased response) [13]. There is even less clear evidence about whether telephone contact can increase recruitment into a study. Margitic et al. compared different recruitment methods for a physical activity trial of sedentary adults aged 35–75 years: patient mailing, office-based questionnaires and telephone contact. However, participants were not randomised to different approaches and recruitment strategies were not centrally tracked. Telephone contact was productive in terms of recruitment, but proved too labour intensive and was abandoned at two sites [14]. Our study therefore provides important new information from a randomised controlled comparison about the positive effect that a telephone contact by a research nurse can have on patients’ recruitment into a study. It also demonstrates the efficiency of allowing people to ‘opt out’ of telephone contact. Our findings may be most relevant to retired older populations where it is easier to make telephone contact.

Effect of inclusion of a questionnaire on recruitment
While there is clear evidence from systematic reviews that longer questionnaires reduce survey response rates [8, 9], there is a lack of evidence about the effect of inclusion of a questionnaire with study information on study recruitment. Although we did not find a significant reduction in recruitment, difference −2.9% (95% CI −12.7–7.0), our findings are consistent with a reduction in response rate.

Implications
We found that telephone contact with a research nurse after receiving study information increased recruitment. Researchers planning studies where recruitment may be low are most likely to consider the extra costs in terms of time and effort incurred by telephoning, a valuable investment for improved recruitment. It is important to recognise that such telephone contact could be considered intrusive and an opportunity for people to opt out should be given; if resources are limited, this also allows research time to be more effectively focused. Inclusion of a questionnaire with the study information did not lead to a significant reduction in recruitment, but our study could not rule out this effect. To optimise recruitment it may be preferable to avoid sending a questionnaire with the study invitation, but to seek ethical approval for this to be sent later to gain non-response information on those not wishing to participate.

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Key points
• Telephone contact with a research nurse after receiving study information increased recruitment and should be considered, particularly in studies where recruitment may be low.
• Telephone contact may be considered intrusive and participants should be offered the opportunity to opt out. If resources are limited, this also allows research time to be more effectively focused.
• Inclusion of a questionnaire with study information was advantageous in providing information to compare participants and non-participants, but may reduce
recruitment, although the effect on recruitment in our study was not significant.

• To optimise recruitment it may be preferable to avoid sending a questionnaire with the study invitation, but to seek ethical approval for this to be sent later to gain non-response information on those not wishing to participate.

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Conflict of interest

None of the authors have any conflict of interest.

Supplementary data

Supplementary data for this article are available at Age and Ageing online.

References


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