An effort to ‘leverage’ the effect of participation in a mass event on physical activity

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SUMMARY

Despite the considerable interest in community-based physical activity (PA) interventions, there is a lack of clarity on which strategies are most effective and most likely to work in different contexts. The purpose of this study was to use existing community resources to promote PA in a population sample of insufficiently active women using a cluster RCT design. Participants (n = 402) were grouped into 32 geographical-based clusters, which were randomly allocated into 16 intervention (n = 193) and 16 control (n = 209) regions. The intervention was delivered in conjunction with regional units of the Irish Sports Council; participants received a pack containing tailored information about local PA options in their community, training plans, stage-matched behaviour change booklets and a pedometer. Control participants received health promotion leaflets. Evaluation was conducted using the RE-AIM framework to assess both effectiveness and generalizability. Repeated measures ANOVAs with adjustment for clustering revealed that both groups displayed an approximate 39 min increase in PA, but decreases in sitting were greater in the intervention group than the control group (32.9 versus 1.2 min). Recall of materials was high ranging between 85 and 97% for the various intervention components. Finally, those who received higher doses of the intervention (three or more components) reported an approximate 50 min increase in PA compared with 18 min among those who did not use any aspect of the intervention. While no clear intervention effect was evident, this research was successful in linking and implementing good research design with PA promoting networks.

Key words: physical activity; community; intervention; REAIM

INTRODUCTION

Community-based interventions to promote physical activity (PA) are needed to reach large, diverse groups of people. Mobilizing the community and its resources for health behaviour change (McLeroy et al., 2003) increase the potential for long-term population-level improvements. Despite the plethora of such interventions (Baker et al., 2011), there remains a lack of clarity in how to translate or disseminate research evidence into real-life settings; termed type 3 evidence by Rychetnik et al. (Rychetnik et al., 2004). A greater consideration of generalizability (external validity) is required but as noted in a recent review of community level PA interventions (Baker et al., 2011) it is also important to develop scientifically sound intervention studies.

Community-based interventions are often based on ecological models of behaviour change, which Sallis et al. (Sallis et al., 2006) identified as necessary to achieve population change. A problem with many community interventions is their lack of generalizability in real-life settings due to local contextual factors, increased complexity and/or cost. The RE-AIM framework (Glasgow et al., 2003) aims to integrate internal and external validity issues that are both important in attempts to transfer research findings into practice. It includes an assessment of reach, which refers to the participation...
rate and representativeness of eligible participants; programme efficacy or effectiveness; the involvement of agents in the community (adoption); the quality of delivery of the intervention (implementation) and long-term programme maintenance. Dzewaltowski et al. (Dzewaltowski et al., 2004) reviewed community-based interventions using this framework and noted that researchers are preoccupied with designing effective programmes and neglect efforts to deliver successful strategies with limited resources to a large number of people.

Physical activity promotion efforts are needed for delivery at a relatively low cost in real-life settings to large, diverse, at risk groups. The Women’s Mini-Marathon in Ireland, an annual mass event, is an excellent prompt to activity for a group who are particularly high priority in relation to promoting PA. Women are consistently less active than males, in Ireland (Morgan et al., 2008) and worldwide (Bauman et al., 2009). The aim of this research was to leverage the effect of participation in a mass event by using existing resources in the community to promote PA among women who had relapsed from sufficient (150 min of at least moderate intensity PA per week) to insufficient PA levels following participation in the event.

METHOD

The RE-AIM framework was used to evaluate this intervention to facilitate an assessment of internal and external validity and to aid the dissemination and transferability of study results into practical settings. The components of the framework were addressed as follows:

- **Reach:** the proportion of eligible participants who took part in the study and the comparison of participants and non-participants (representativeness).
- **Effectiveness:** changes in PA, sitting, social support and self-efficacy.
- **Adoption:** the participation and representativeness of community settings/resources in the intervention and the participation rate of individual participants (drop out).
- **Implementation:** the extent and accuracy of programme delivery (intervention fidelity) and the dose received and success of delivery (recall rates).
- **Maintenance:** sustained changes in PA following participation in a mass event and practical implications of the trial.

**SAMPLE AND DESIGN**

As illustrated in Figure 1, participants were recruited from over 50 000 women who had taken part in either of two mass community walk/run events (Women’s Mini Marathon) in Ireland in
2008. Participants completed surveys on their PA levels, using the International Physical Activity Questionnaire (IPAQ), prior to and 3-month post-event resulting in a total matched sample of 3853. Previous analysis revealed that these events attract more than the habitual exerciser with many women participating and training before the event at a low intensity (Lane et al., 2010a). It was also apparent that many participants maintained sufficient engagement in PA after the event, although some women who completed the event did not meet minimum requirements for regular PA at any stage, and others relapsed to insufficient PA levels following the event.

Eligible participants for this trial were ‘relapers’ who had decreased their participation in PA at follow-up. Specifically, relapers were participants who decreased their PA by at least 240 MET-min/week (~60 min or more of at least moderate intensity activity), and had moved from the ‘high’ or ‘moderate’ (i.e. exceeding or meeting the minimum guidelines for PA of 150 min of at least moderate intensity activity per week (International Physical Activity Questionnaire, 2005) to the ‘low’ active (i.e. not meeting minimum PA guidelines) IPAQ category (n = 418) between baseline (prior to the event) and follow-up (3-month post-event). Eligible participants also included individuals who were ‘low’ active at both time points (n = 208). Approximately 64.0% (n = 402) of those eligible consented to participate. These were then grouped based on their Irish Sport Council defined Local Sports Partnership (LSP) region. The LSPs were developed to promote PA at a local level through collaboration with sports agencies and organizations, enhanced use of available resources and facilities and, through support of groups, clubs and communities who provide opportunities for sport and PA. There are 29 LSPs in Ireland, which corresponds to national coverage across the 26 counties in Southern Ireland that are within the remit of the Irish Sports Council.

The research design was a cluster RCT to reduce contamination between individuals within their respective region and to facilitate the use of LSPs, leisure clubs, walking groups etc. as intervention agents. The number of consenting individuals in each cluster ranged between 1 and 52. Subsequently, some units were combined and arranged into matched pairs based on sample size before being randomly allocated to the intervention (n = 16) and control (n = 16) condition.

Measures

PA, sedentary behaviour, self-efficacy and social support were targeted in the intervention protocol and thus were the main outcome measures for the study. Previously validated tools were used where possible. Process evaluation measures were assessed to investigate receipt and use of, and engagement with the various components of the intervention at follow-up only while readiness to change permitted targeting of intervention materials at baseline.

PA and sedentary behaviour (sitting) data were collected using the IPAQ short form, which has comparable reliability and validity to other self-report measures (Craig et al., 2003). Participants were asked to provide detail on the amount of vigorous and moderate activity, and walking, they undertook in the previous week. Data were then presented as days and minutes of PA per week. Participants were also asked to record total time spent sitting on an average day.

Self-efficacy was assessed using a modified version of Marcus and Owen (Marcus and Owen, 1992) self-efficacy scale. Participants were asked to indicate their agreement with four different statements concerning their confidence to be active when they are stressed, tired, have family commitments or the weather is bad.

Social support was assessed using a modified version of the social support for exercise scale (Sallis et al., 1987). Participants were asked how often their family or friends had provided support for their participation in PA.

Process evaluation included questions on the receipt and use of materials and on engagement with local opportunities for PA.

Readiness to change was assessed using a tool developed by Marcus and Owen (Marcus and Owen, 1992) to measure exercise motivational stage. Participants were asked to indicate their perceived PA status from a 5-point scale, which corresponded to the different stages of PA adoption as described in the TTM model of behaviour change.

Intervention

At the start of the 9-week intervention period, each participant (n = 193) in the 16 intervention groups was mailed a pack that was targeted to both the group and individual participant. This included an information sheet about participant’s
local community resources, and a print booklet matched to each individual’s readiness to change. Further detail is available elsewhere (Lane et al., 2010a,b) but in brief, one booklet called ‘Time to Get Moving’ was designed to target participants in the initial stages of motivational readiness and included information on the benefits of PA, guidelines for PA and how to increase motivation. The second booklet called ‘Keep Moving’ was tailored to participants who were in the middle or latter stages of motivational readiness and contained information on ‘moderate intensity’ activity and being active beyond minimal levels. This intervention incorporated the communication of social and environmental supports for PA through the promotion of walking and training groups and exercise classes. Efforts were also made at an intra-personal level to promote goal setting and problem solving through the provision of training plans, PA diaries, case studies and tips for overcoming barriers. Overall, this represented a motivational and educational effort to improve PA. Pedometers and related booklets (Lane et al., 2010a) were also distributed to participants in the intervention group during the study period to act as a further prompt for PA. The intervention was developed in conjunction with and supported by the national PA promoting network of LSPs.

Control group
Each participant (n = 209) in the control group (n = 16) received a placebo treatment; a healthy eating leaflet, and a letter explaining that they had been selected in the control group and would be mailed the information pack at the end of the study period.

Table 1: Baseline characteristics of participants in the cluster RCT

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n = 193)</th>
<th>Control (n = 209)</th>
<th>Non-participants (n = 223)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aged &lt;40 (%)</td>
<td>57.3</td>
<td>48.3</td>
<td>73.9†</td>
</tr>
<tr>
<td>Married (%)</td>
<td>67.5</td>
<td>62.7</td>
<td>59.2</td>
</tr>
<tr>
<td>No children (%)</td>
<td>38.2</td>
<td>39.2</td>
<td>57†</td>
</tr>
<tr>
<td>Medical card holder (%)</td>
<td>19.4</td>
<td>21.1</td>
<td>14</td>
</tr>
<tr>
<td>Tertiary education (%)</td>
<td>40.5</td>
<td>47.3</td>
<td>71.7†</td>
</tr>
<tr>
<td>Urban (%)</td>
<td>57.9</td>
<td>64.2</td>
<td>68.3</td>
</tr>
<tr>
<td>Overweight/obese (%)</td>
<td>34.3</td>
<td>36.9</td>
<td>29.7</td>
</tr>
<tr>
<td>Average total physical activity minutes/week (M, SD)</td>
<td>53.5 (61.1)</td>
<td>49.5 (66.9)</td>
<td>–</td>
</tr>
<tr>
<td>Average sitting minutes/day (M, SD)</td>
<td>270.9 (174.7)</td>
<td>239.5 (144.8)</td>
<td>–</td>
</tr>
</tbody>
</table>

*p < 0.05 intervention versus control.
†p < 0.05 participants versus non-participants.

Statistical analysis
Descriptive statistics for PA data and intermediate outcomes were calculated and analysed using repeated measures ANOVA to assess changes pre- and post-intervention in the intervention and control groups. To adjust for clustering, a complex design file was created in SPSS Version 17, while age, education and place of residence were included as covariates in the final analysis. An intraclass correlation coefficient (ICC) and design effect were calculated for all outcome variables.

RESULTS

Pre-test analysis
ICCs were small (~0.05 to 0.05), which suggests that individuals within clusters in this trial were no more likely to have similar outcomes to each other than to other participants in other clusters. Subsequent design effects were primarily >1, which infers that more cases may have been needed in this cluster design to obtain results with a similar precision to those that would have been acquired in a simple, randomized trial.

Reach
There was an overall participation rate of 63.0% and differences were apparent between participants and non-participants in the trial (Table 1). The latter were significantly (p < 0.05) older, more likely to have children and not have tertiary education than non-participants. At baseline, there were no significant differences in socio-demographic factors, obesity and reported activity/inactivity between participants in the intervention and control group (Table 1).
Effectiveness

At follow-up a small but significantly greater proportion (p < 0.05) of the intervention group were sufficiently active than the control group (11.5 versus 9.7%). Also, the intervention group reported a 33 min decrease in sitting time over the study period compared with a 1 min decrease in the control group (p < 0.05). Both intervention and control participants reported similar significant within group increases (≏39 min) in total time spent being active but there was no between-group differences (Table 2).

Table 3 indicates that respondents aged <40 displayed more favourable changes (p < 0.05) in sitting time but older respondents showed an approximate 8 min greater increase in time spent being active than their younger counterparts (p < 0.05). Unmarried participants and women with no children reported an almost 60 min decrease (p < 0.05) in sitting time in the intervention and control groups. Participants living in a rural area in the control group reported an increase in sitting time compared with their counterparts in the intervention group, who reported an almost 30 min daily decrease. Notably, participants in the intervention group who did not have tertiary education experienced a 70 min increase in PA compared with a 14 min improvement among those who did not have complete college education (p < 0.05); this trend was also apparent in the control group. Finally, there was little change in self-efficacy following the intervention, but there was a significant increase (p < 0.05) in reported social support for activity in both intervention and control groups.

Adoption

The design and delivery of the intervention was supported and facilitated by the Irish Sports Council and their regional bodies (LSPs), which ensured a full participation rate. At follow-up, 125 (64.8%) participants in the intervention group and 159 (76.1%) in the control group returned completed questionnaires. Individuals in the intervention group who remained in the study were more likely to have trained continuously prior to and participated repeatedly in the initial PA events than those who dropped out; there was no difference between the intervention and control group.

### Table 2: Physical activity and sitting time at baseline and follow-up in the cluster RCT

<table>
<thead>
<tr>
<th></th>
<th>Intervention baseline (n = 193)</th>
<th>Control baseline (n = 209)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Nine weeks (n = 125)</td>
<td>Nine weeks (n = 159)</td>
</tr>
<tr>
<td>Average total PA minutes/week (M, SE)</td>
<td>42 (2.6)</td>
<td>45.6 (2.2)</td>
</tr>
<tr>
<td>Baseline</td>
<td>84.9 (4.5)*</td>
<td>80.3 (2.6)*</td>
</tr>
<tr>
<td>Change in total PA minutes/week (M, 95% CI)</td>
<td>38.9 (31.3–46.5)</td>
<td>38.6 (31.8–45.4)</td>
</tr>
<tr>
<td>Average total activity days/week (M, SE)</td>
<td>2.1 (0.14)</td>
<td>2.2 (0.11)</td>
</tr>
<tr>
<td>Baseline</td>
<td>6 (0.22)*</td>
<td>5.3 (0.15)*</td>
</tr>
<tr>
<td>Change in total activity days/week (M, 95% CI)</td>
<td>3.6 (3.3–4.1)</td>
<td>3.3 (3.0–3.5)</td>
</tr>
<tr>
<td>% Insufficiently active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Nine weeks</td>
<td>88.5</td>
<td>90.3</td>
</tr>
<tr>
<td>% Sufficiently active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nine weeks</td>
<td>11.5</td>
<td>9.7†</td>
</tr>
<tr>
<td>Total sitting minutes/day (M, SE)</td>
<td>274.1 (6.6)</td>
<td>236.8 (7.4)</td>
</tr>
<tr>
<td>Baseline</td>
<td>239.9 (4.6)</td>
<td>252.9 (2.4)</td>
</tr>
<tr>
<td>Change in total sitting minutes/day (M, 95% CI)</td>
<td>−32.9 (−46.1 to −19.9)</td>
<td>−1.2 (−8.3 to 5.9)†</td>
</tr>
</tbody>
</table>

*All data adjusted for cluster effects.
*p < 0.05 baseline versus nine weeks.
†p < 0.05 intervention versus control.
Implementation

Approximately 97.0% of intervention participants who engaged in the follow-up assessment recalled receiving the PA booklets compared with 78.0% of the control group (p < 0.05). Overall, the recall of materials was quite high and the pedometer appeared to be the most well received component of the intervention (Table 4). At follow-up, almost two-thirds (65.0%) of participants reported using these pedometers while over 38.0% used the walking routes that were recommended. A similar proportion of participants contacted local groups involved in promoting PA, such as leisure centres, and walking and cycling clubs.

Finally, Table 5 illustrates that while there were no significant differences between participants who received different doses of the intervention, those who engaged with two or more components of the intervention did display a trend towards a greater change in total PA minutes per week. Also, using any part of the intervention was related to decreases in sitting time compared with increases among participants who used none.

Maintenance

Maintenance of behaviour change was assessed at 9 weeks only but the primary aim of this research was to develop strategies to build on the initial impact of a mass event. Therefore, the measurement and observed improvement in PA ~6-month post-participation in the event (at the end of the intervention period) suggests that this post-event contact helped to sustain year round engagement in PA. At a setting level, study findings have been published for practitioners (Lane et al., 2010a) with practical, straightforward guidelines for LSPs and other agencies charged with promoting PA and intervention materials have been made available on Ireland’s national PA website (www.getirelandactive.ie).

DISCUSSION

This study was undertaken to assess if existing resources for PA in communities could be used
to stimulate increased participation levels among insufficiently active women. Community-based interventions purport to be transferable to real-life settings but in reality they often prioritize theoretical fidelity to the detriment of generalizability (Dzewaltowski et al., 2004). Therefore, the evaluation of the programme and this discussion was guided by the RE-AIM framework (Glasgow et al., 2003), which considers if an intervention is effective and generalizable.

In relation to reach, the first part of the RE-AIM framework, a participation rate of 63.0% (of the total sample) suggests good reach, somewhat unsurprising considering that eligible participants had displayed some initial enthusiasm for PA by taking part in a mass event. This particular aspect of reach is well reported on but information on representativeness is inconsistently assessed in general assessments of PA interventions (Dzewaltowski et al., 2004) and in evaluations incorporating the RE-AIM framework (Aittasalo et al., 2012; Carlfjord et al., 2012). In this study, even though there was a difference between participants and non-participants, the trial was successful in recruiting typically hard to reach subgroups of women who are often most at risk of ill health. Women with children and those without tertiary education were more likely to participate in this trial ($p < 0.05$). Furthermore, there were a higher proportion of older women, married women, overweight/obese women and women with medical cards among participants.

The second aspect of the RE-AIM framework refers to the effectiveness of the intervention. Firstly, a decrease in sitting time of over 33 min in the intervention group was more substantial than the observed change in the control group (1 min). This intervention did not include specific targeting of sitting time so this outcome is a by-product of efforts to promote PA. This is a novel and important finding in relation to tackling sedentarism particularly as Owen et al. (Owen et al., 2011) recently advocated measuring changes in sedentary time following PA interventions but could not identify any instance where sitting had been influenced by PA-based strategies. Increases in PA were apparent but a clear intervention effect was not visible as improvements were similar in both groups. Baker et al. (Baker et al., 2011) reported inconsistent evidence for the effectiveness of community-based interventions, which included several trials that reported no differences between intervention and control group participants. This review also incorporated an assessment of the equity of analysis reported in intervention studies to investigate whether the programme delivered successfully reached the whole community. To this end, in this research, it was found that older women in the intervention group had a greater overall increase in PA primarily due to an increase in walking. There were also positive changes among married women, women living in rural areas and those reporting less than tertiary education, but these were tempered somewhat by higher activity levels among their single, urban-dwelling counterparts at baseline and follow-up or very low participation levels before the intervention commenced.

In relation to adoption, Goode et al. (Goode et al., 2012) recently reported on the dissemination of their intervention and noted that funding and community engagement was critical to the adoption of their programme. This research represented a good effort to link a cluster RCT with the reality of engaging with community resources and local PA promoting groups and facilities. The intervention, which sourced and communicated information on existing structures within the community, is not part of the standard practice and general workings of LSPs, the primary intervention agent in this study.

### Table 5: Change in physical activity and sitting across dose of intervention groups in the cluster RCT

<table>
<thead>
<tr>
<th>Used 0 components of intervention</th>
<th>Change in average total physical activity minutes/week ($n = 125$) (M, SE)</th>
<th>Change in sitting minutes/day ($n = 125$) (M, SE)</th>
<th>Sufficiently active ($n = 125$) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used 1 component</td>
<td>17.9 (4.7)</td>
<td>57.1 (7.7)</td>
<td>4.5</td>
</tr>
<tr>
<td>Used 2 components</td>
<td>42 (6.3)</td>
<td>−61.5 (10.2)</td>
<td>14</td>
</tr>
<tr>
<td>Used 3 or more components</td>
<td>53.9 (13.7)</td>
<td>−56.1 (9.6)</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>49.7 (3.5)</td>
<td>−15.1 (4.9)</td>
<td>10</td>
</tr>
</tbody>
</table>

*aAll data adjusted for cluster effects.  
*p < 0.05 dose of intervention groups.*
Therefore, the design and delivery of the intervention represented a partnership between these regional entities and the researchers. All LSPs engaged in this process as the research was supported nationally by their governing body (the Irish Sports Council) but these agencies do not represent all of those involved in promoting PA on a daily basis and, project management came mainly from the researcher primarily due to resource constraints within LSPs. Similarly, Jenkinson et al. (Jenkinson et al., 2012) remarked that the major barriers to the adoption of their school-based programme also came from within the intervention setting, citing factors such as a lack of support, training and time as significant negative impacts.

Implementation is another aspect of the RE-AIM framework and Dzewaltowski et al. (Dzewaltowski et al., 2004) and Wilson et al. (Wilson et al., 2010) both noted that it should be assessed in relation to intervention fidelity (was it delivered as planned), the dose or amount delivered and the dose received. As this intervention was managed centrally, relative consistency in its administration and a subsequent high fidelity was managed centrally, relative consistency could be assumed. However, due to the considerable variety in programmes offered, resources available, etc within individual LSPs, each cluster in the trial received slightly different intervention protocols. Wilson et al. (Wilson et al., 2010) proposed that high dose corresponds to values of >75.0% engagement with an intervention component, moderate dose between 50 and 74.0% and low dose 25 and 49.0% engagement. In this study, receiving and reading intervention materials was high, ranging between 85.0 and 97.0%, contact with groups such as LSPs and gyms was quite low (7–23.0%) and use of strategies, such as walking routes and pedometers showed low-to-moderate engagement (23–65.0%). Wilson et al. (Wilson et al., 2010) also suggested that the dose of intervention delivered should be assessed in relation to outcomes. Intervention dose was split into four categories; using none of the intervention strategies, using one, using two or using three or more. The latter groups reported greater changes in total PA, an increase of ~50 min post-intervention, while using any aspect of the intervention resulted in a minimum 20 min greater increase in PA and substantial decreases in sitting compared with using none of the intervention (p > 0.05).

The last aspect of the RE-AIM framework refers to the long-term maintenance of behaviour change at the individual level and the sustained presence of a new practice or treatment at the setting level (Glasgow et al., 2003). In this study, the focus was to facilitate long-term improvements in PA following an initial prompt to action (i.e.) participation in the Mini-Marathon mass event. Unfortunately, follow-up in this study was only undertaken in the short term, and sustainability could not be assessed. Other studies (Napolitano et al., 2006; Keyserling et al., 2008) engaged in at least two follow-ups, one of which was some time post-intervention. At a setting level, study findings have been published for practitioners (Lane et al., 2010a) with practical, straightforward guidelines for LSPs and other agencies charged with promoting PA. Efforts have been and are being devised to ensure that the lessons learned from this research transfer beyond the experimental setting and have a practical impact. Firstly, three-quarters of the participants were not aware of LSPs prior to the study but simple communication led to a similar proportion becoming cognizant of this local entity at follow-up. Formal discussions with LSPs are on-going to support the systematic collection of user data to tailor and communicate information to specific target groups and to provide regular prompts for activity, and also to assist the design and evaluation of their PA-related initiatives. Evaluations have been undertaken on several events including a school-based programme (Muldoon et al., 2008) and a local cycling event. Secondly, due to favourable recall rates, the concept of communicating information on local opportunities for PA has been adopted by Ireland’s national award winning website on PA (www.getirelandactive.ie) and intervention brochures are also available on this web portal. Importantly, communication alone about initiatives does not appear to be sufficient to instigate engagement. More direct recruitment or publicity efforts may still be required. Finally, it appears that simple reinforcement strategies before and after mass events that extend beyond the marketing of the event itself could enhance the public health impact of these initiatives, serving as a reminder to be active for those who are already somewhat predisposed to engaging in PA.

LIMITATIONS

A clear intervention effect was not found; both groups displayed an increase in PA, which suggests that any attention or contact could have
caused this predominantly previously active cohort of participants who were in the latter stages of readiness to change, to improve their PA. Furthermore, a previous preference for PA in relation to training and repeat participation in mass events was related to engagement in the trial. Also, transient or other reasons may have been responsible for women being classified as relapers and thus eligible participants. Participant behaviour may have been cyclical and regular PA may have been resumed after an initial drop off in PA regardless of any subsequent intervention. Also, although controls received a placebo treatment on healthy eating, they may have been exposed to communication about PA from their local LSP and other sources; as is the remit of these organizations. The design of this study, as a community-based initiative, limited the ability to control and manage these external influences. The observed change in PA may also be due to over reporting at follow-up after participants were sensitized to the questionnaire. Also, there may be a potential social desirability bias apparent as participants perceive that they should communicate greater participation in PA than their actual true involvement. Furthermore, questionnaires including the IPAQ, which has been validated and most commonly used in population studies, are not particularly sensitive to changes in PA that may occur during a short intervention. Owing to a lack of alternate resources and the use of IPAQ to collect baseline data on the initial population sample in this study, it was necessary to assess PA at follow-up using this same instrument. Finally, while receipt and general recall of the intervention strategies was quite high, the actual dose used by participants was somewhat low. Almost 60% of the participants used none or just one component of the intervention. Communication alone was not entirely efficacious in motivating these participants to use a variety of opportunities for activity in their locality.

CONCLUSION

Dzewaltowski et al. (Dzewaltowski et al., 2004) claimed that published studies do not adequately evaluate the effectiveness and transferability of interventions to promote PA while Baker et al. (Baker et al., 2011) observed that many community-based interventions are poorly designed. In this study, groups were randomly allocated to the intervention and control condition and PA was assessed using a validated reporting tool. However, there was no clear intervention effect, which may have been due to participants existing preference for being active, controls accessing PA advice and resources outside this randomized trial or the lack of engagement with aspects of the intervention programme. Despite this, practical implications and sustained outcomes have been identified but continued research to develop clearly effective strategies to promote PA at a population level are still required. More high-quality economic evaluations are also important to ensure these interventions are value for money. Finally, translation research must to be undertaken to identify dissemination strategies for PA interventions.

FUNDING

This research was supported by the Irish Sports Council.

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