A Pilot Trial of Three Very Brief Interventions for Physical Activity in Primary Care

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December 4th, Nottingham
Background

- Physical inactivity is the fourth leading risk factor for death worldwide\(^1,2\); in the UK, it has an estimated direct cost to the NHS of £1.06 billion\(^3\)

- Need for scalable interventions that are cost-effective in primary care setting

- Evidence suggests that ‘brief’ interventions (up to 30 minutes) in primary care could increase physical activity\(^4\)

- However, little is known about ‘very brief’ interventions (up to 5 minutes) delivered as part of routine consultations

- NHS Health Checks ideal opportunity to deliver very brief advice to a large population

1 WHO 2010
3 Allender et al. J Epidemiol Community Health, 2007
4 NICE 2012
VBI Pilot Trial

- Builds on earlier development work – developed and selected a number of 5-minute VBIs and tested their feasibility in a small sample\(^5\)

- **Aim:** to test the potential efficacy, feasibility, acceptability and cost of three VBIs against usual care (routine NHS health check)

- Findings to inform the selection of the ‘best-bet’ intervention to be tested in a fully-powered randomised controlled trial

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\(^5\) Pears et al. 2014 [submitted for publication]
Method: CONSORT Flow Diagram

Invited to attend HC and participate in study (n=2199)*

Non-responders (n=1791)*

Randomized (n=394) §
[1:1:1:2]

Enrollment

Allocation

Motivational
n=83

Pedometer
n=74

Combined
n=80

Usual care
n=157

Follow-Up at 1 month

Motivational
n=61 (73%)

Pedometer
n=51 (69%)

Combined
n=64 (80%)

Usual care
n=124 (79%)

*Excludes data from practice which withdrew participation from the trial
§Includes n=11 from practice which withdrew participation from the trial; hence, invited minus non-participants do not total to 383 but 394
# Very Brief Interventions (VBIs)

## All VBIs

**Face-to-Face Discussion**
- Feedback on current physical activity (PA)
- Physical activity recommendations

**Motivational Booklet**
- PA Recommendations
- Benefits of Increasing PA
- Importance and Confidence
- Making a Plan & Keeping a Diary
- Tips for increasing PA
- Tips for staying motivated
- Signposting

**Pedometer Booklet & Step Chart**
- PA Recommendations
- 10,000 steps recommendation
- How to use the pedometer
- Daily step goal and self-monitoring
- Tips for increasing steps

**Combined**
- **Face-to-Face Discussion**
  [Combination of Motivational and Pedometer]
- **Motivational Booklet & Step Chart**
  [Combination of Motivation and Pedometer]

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[University of Cambridge logo]
Measures

- **Potential Efficacy**
  - Average accelerometer counts per day [ActiGraph GT3X+]
  - Total physical activity energy expenditure (PAEE) [validated RPAQ version 8]

- **Feasibility**
  - Intervention duration (mins, secs) [consultation audio-recordings]
  - Intervention fidelity (%) [consultation audio-recordings]

- **Acceptability**
  - Transcripts of participant interviews
  - Transcripts of practitioner interviews

- **Cost**
  - Per-participant cost, based on cost of materials and estimated cost of practitioner time
Results: Participants

- 394 participants recruited and randomised between April 2013 and Feb 2014
- Demographics show participants were comparable across arms

<table>
<thead>
<tr>
<th></th>
<th>Total Sample (n=394)</th>
<th>Motivational (n=83)</th>
<th>Pedometer (n=74)</th>
<th>Combined (n=80)</th>
<th>Usual Care (n=157)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD), years</td>
<td>53 (9.1)</td>
<td>52.1 (8.1)</td>
<td>53.3 (8.4)</td>
<td>51.3 (8.4)</td>
<td>53.9 (10.1)</td>
</tr>
<tr>
<td>Gender % female</td>
<td>59</td>
<td>54</td>
<td>61</td>
<td>62</td>
<td>59</td>
</tr>
<tr>
<td>Ethnicity % white</td>
<td>92</td>
<td>92</td>
<td>97</td>
<td>96</td>
<td>94</td>
</tr>
<tr>
<td>Occupation % employed</td>
<td>72</td>
<td>70</td>
<td>79</td>
<td>76</td>
<td>68</td>
</tr>
</tbody>
</table>
### Physical Activity (at 1 month follow-up)

<table>
<thead>
<tr>
<th>Objective PA (accelerometer)</th>
<th>Control Mean (95% CI)</th>
<th>Motivational Mean (95% CI)</th>
<th>Pedometer Mean (95% CI)</th>
<th>Combined Mean 95% (CI)</th>
<th>Motivational Relative to Control: Comparison of means (95% CI) §</th>
<th>Pedometer Relative to Control: Comparison of means (95% CI) §</th>
<th>Combined Relative to Control: Comparison of means (95% CI) §</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity (counts per minute)</td>
<td>636 (597, 674)</td>
<td>656 (600, 712)</td>
<td>659 (581, 738)</td>
<td>632 (590, 675)</td>
<td>+20.3 (-45.0, +85.7)</td>
<td>+23.5 (-51.3, +98.3)</td>
<td>-3.1 (-69.3, +63.1)</td>
</tr>
<tr>
<td>Self-report PA measures (RPAQ)</td>
<td>PAEE Physical activity energy expenditure (kJ/kg/day)</td>
<td>32.2 (28.2, 36.9)</td>
<td>39.2 (31.5, 48.9)</td>
<td>32.2 (26.7, 38.8)</td>
<td>33.0 (28.3, 38.5)</td>
<td>+21.7% (-2.9%, +52.5%)</td>
<td>-0.2% (-22.4%, +28.4%)</td>
</tr>
</tbody>
</table>

§ Comparisons are presented unadjusted. Conclusions were unchanged on adjustment for age

- Posterior probability of positive effect was estimated to be 73% for both the motivational and pedometer interventions, and 46% for the combined intervention.
Feasibility: Duration and Fidelity

- The pedometer intervention was the shortest on average
- All interventions were delivered relatively well

<table>
<thead>
<tr>
<th></th>
<th>Motivational (n=11)</th>
<th>Pedometer (n=13)</th>
<th>Combined (n=16)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean VBI Duration</strong> (in minutes and seconds) / Mean (SD)</td>
<td>6m 48s (1m 51s)</td>
<td>5m 00s (2m 14s)</td>
<td>9m 35s (2m 49s)</td>
</tr>
<tr>
<td><strong>Overall Fidelity (%)</strong> / Mean (SD)</td>
<td>62% (18%)</td>
<td>72% (16%)</td>
<td>74% (10%)</td>
</tr>
</tbody>
</table>
Acceptability

- The pedometer intervention was favoured by practitioners, due to its brevity, the ease of delivery and perceived response from participants.

- All interventions were acceptable to participants.

**PRACTITIONERS (n=12)**

- Pedometer intervention was the easiest and quickest to deliver.
- The motivational intervention is least likely to be effective.
- Most confident delivering the pedometer and the combined intervention.
- Patients responded best to the pedometer and combined intervention.

**PARTICIPANTS (n=37)**

- Advice was a good reminder of what was already known—reinforcing/motivating.
- Pedometer will be interesting, to see how many steps already take on a normal day.
- Physical activity advice with motivational and pedometer intervention more generic.
Cost

- All interventions were of low cost
- Cost was higher for both the pedometer and combined intervention, due to the added cost of the pedometer

<table>
<thead>
<tr>
<th></th>
<th>Motivational</th>
<th>Pedometer</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated cost of practitioner time*</td>
<td>£4.99</td>
<td>£3.67</td>
<td>£7.03</td>
</tr>
<tr>
<td>Actual cost of printed materials</td>
<td>£1.84</td>
<td>£1.42</td>
<td>£1.95</td>
</tr>
<tr>
<td>Actual cost of pedometer</td>
<td>£0</td>
<td>£12.00</td>
<td>£12.00</td>
</tr>
<tr>
<td>Total cost of VBI per participant</td>
<td>£6.83</td>
<td>£17.09</td>
<td>£20.98</td>
</tr>
</tbody>
</table>
Discussion

- Both the motivational and pedometer intervention showed potential to increase physical activity in the short-term.

- The pedometer intervention was the most feasible, and most acceptable to both practitioners and participants.

- Currently evaluating the pedometer intervention in a large-scale randomised controlled trial.

- The pilot trial offers a practical example of evaluating multiple interventions using a range of criteria (potential efficacy, feasibility, acceptability, cost).
VBI Programme Team

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Sponsors: University of Cambridge
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Behaviour Change Techniques

**Face-to-face discussion:**
- Feedback on PA
- PA recommendations
- How to use pedometer
- Steps/day goal
- How to self-monitor

**Step It Up Booklet:**
- Feedback on PA
- PA recommendations
- How to use pedometer
- Steps/day goal
- How to self-monitor
- Benefits of PA
- Tips for increasing PA
- Local resources info

**Pedometer & Step Chart**
- 1.1 Goal setting (behaviour)
- 1.4 Action Planning
- 2.2 Feedback on behaviour
- 4.1 Instruction on how to perform the behaviour
- 8.7 Graded tasks
- 2.3 Self-monitoring of behaviour
- 5.1 Information about health consequences
- 5.3 Information about social and environmental consequences
- 5.6 Information about emotional consequences
- 12.5 Adding objects to the environment
## Fidelity Coding Frame

<table>
<thead>
<tr>
<th>10,000 steps</th>
<th>The Pedometer</th>
<th>The Booklet</th>
<th>The Step Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.1</strong></td>
<td><strong>5.2</strong></td>
<td><strong>5.3</strong></td>
<td><strong>5.4</strong></td>
</tr>
<tr>
<td>Nurse states the recommendation for 10,000 steps per day</td>
<td>Nurse explains/implys that the pedometer measures steps per day and can be used to measure activity</td>
<td>Nurse explains/patient how to wear the pedometer</td>
<td>Nurse tells the patient the pedometer contains instructions/replacement battery/what to do if faulty</td>
</tr>
</tbody>
</table>
| Yes = 1  
No = 0  
Unsure = 9 | Yes = 1  
No = 0  
Unsure = 9 | Yes = 1  
No = 0  
Unsure = 9 | Yes = 1  
No = 0  
Unsure = 9 |
| **5.5**      | **5.6**       | **5.7**     | **5.8**        |
| Nurse tells the patient the booklet contains tips for how to make small increases/introduction to the step chart | Nurse explains how to monitor daily steps using the step chart | Nurse explains how to set a step goal each week | Nurse emphasizes that any increase is good/don’t have to start with 10,000 steps |
| Yes = 1  
No = 0  
Unsure = 9 | Yes = 1  
No = 0  
Unsure = 9 | Yes = 1  
No = 0  
Unsure = 9 | Yes = 1  
No = 0  
Unsure = 9 |
| **5.9**      |               |             |                |
| Nurse shows the patient how to convert steps to miles/how to see how far they’ve walked | | | |
## Fidelity & Duration

<table>
<thead>
<tr>
<th></th>
<th>VBI 1 (n=11)</th>
<th>VBI 2 (n=13)</th>
<th>VBI 3 (n=16)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PA Feedback</strong></td>
<td>0.8</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>PA Recommendations</strong></td>
<td>2.8</td>
<td>2.7</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Motivational</strong></td>
<td>5.1</td>
<td>-</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Pedometer</strong></td>
<td>-</td>
<td>7.0</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Ending session</strong></td>
<td>1.8</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Overall Fidelity (mean)</strong></td>
<td>10.5 (max 17)</td>
<td>12.2 (max 17)</td>
<td>18.6 (max 25)</td>
</tr>
<tr>
<td><strong>Overall Fidelity (%)</strong></td>
<td>62.0</td>
<td>71.9</td>
<td>74.3</td>
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<tr>
<td><strong>Mean VBI Duration (in mins and s)</strong></td>
<td>6m 48s</td>
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Combined VBI (n=16)