Effects of a comprehensive community-based lifestyle intervention in patients with coronary artery disease: the RESPONSE² trial

Randomized Evaluation of Secondary Prevention by Outpatient Nurse Specialists 2

Ron Peters, MD, PhD
on behalf of the study group

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Academic Medical Center
Amsterdam
the Netherlands
Among patients with coronary artery disease (CAD), lifestyle risk factors (LRFs) are common.

Main 3 LRFs:
- overweight
- physical inactivity
- smoking

Improvement of LRFs reduces cardiovascular morbidity and mortality.

However, modification of LRFs is very challenging.
Background (2)

- Nurse-led care improves
  - drug-treated cardiovascular risk factors (BP, LDL-C)
  - quality of life in CAD patients
    (RESPONSE 1 trial*)

- However, the impact on LRFs is minimal

- Hospital-based approaches may be insufficient to change a patient’s daily routines

*Jorstad HT et al. Heart 2013;99: 1421-1430
Hypothesis

LRFs in CAD patients will be improved by

• nurse-coordinated referral to
• a comprehensive set of up to three community-based interventions to achieve
  – weight loss,
  – improvement of physical activity, and
  – smoking cessation,
• encouraging partner participation,
• on top of usual care.
<table>
<thead>
<tr>
<th>Weight</th>
<th>Activity</th>
<th>Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight Watchers</strong></td>
<td>• emphasizes a healthy diet</td>
<td>• smoking cessation</td>
</tr>
<tr>
<td></td>
<td>• changing unhealthy behavior</td>
<td>• telephone counselling</td>
</tr>
<tr>
<td></td>
<td>• regular physical activity</td>
<td>• motivational interviewing</td>
</tr>
<tr>
<td></td>
<td>• group motivation</td>
<td>• pharmacologic support</td>
</tr>
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<td></td>
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</tr>
<tr>
<td><strong>PHILIPS directlife</strong></td>
<td>• internet-based program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• improving physical activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• accelerometer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• online coach, feedback</td>
<td></td>
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<tr>
<td></td>
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<tr>
<td><strong>Lucht Signaal</strong></td>
<td>• smoking cessation</td>
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<td></td>
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<td></td>
<td>• pharmacologic support</td>
<td></td>
</tr>
</tbody>
</table>
Design

• Inclusion:
  o ACS and/or coronary revascularization < 8 weeks
  o At least one of the following LRFs:
    1. BMI > 27 kg/m²
    2. physical inactivity: < 30 min; 5 times / week
    3. smoking (on admission)

• Exclusion:
  o planned revascularization
  o insufficient motivation
  o programs not feasible
  o Hospital Anxiety and Depression Scale > 14
Usual care, guideline based

- Visits to the cardiologist
- Cardiac rehabilitation
- Nurse-led secondary prevention program
  - healthy lifestyles
  - drug-treated risk factors
  - medication adherence
Intervention

• Nurse-coordinated referral to up to 3 community-based programs
  o Weight Watchers™
  o Philips DirectLife™
  o Luchtsignaal™

• Number and sequence of programs determined by the patient’s risk profile and preference

• Partners offered program participation
Primary outcome

The proportion of successful patients at 12 months

- **Success** defined at patient level as:
  - improvement of at least one LRF
  - without deterioration in the other two

- **Objective outcome measurements**:
  - weight (kg)
  - 6 Minute Walking Distance (meters)
  - urinary cotinine (>200 microgram/L)
Enrollment

RCT in 15 centers in the Netherlands

April 2013 to July 2015

2031  CAD patients screened
824  informed consent and randomized
731  12 months follow-up
711  primary analysis
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intervention (n=360)</th>
<th>Control (n=351)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>58.2 ±9.0</td>
<td>59.2 ±9.4</td>
</tr>
<tr>
<td>Female</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>94%</td>
<td>92%</td>
</tr>
<tr>
<td>Married, cohabitating</td>
<td>83%</td>
<td>81%</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>29.8 ±4.3</td>
<td>29.3 ±4.3</td>
</tr>
<tr>
<td>Overweight (BMI&gt;27)</td>
<td>75%</td>
<td>72%</td>
</tr>
<tr>
<td>Physically inactive</td>
<td>63%</td>
<td>62%</td>
</tr>
<tr>
<td>Smoking on admission*</td>
<td>48%</td>
<td>47%</td>
</tr>
<tr>
<td>Antiplatelet agents</td>
<td>99%</td>
<td>97%</td>
</tr>
<tr>
<td>Lipid lowering drugs</td>
<td>97%</td>
<td>97%</td>
</tr>
<tr>
<td>β-Blockers</td>
<td>83%</td>
<td>87%</td>
</tr>
<tr>
<td>ACE inhibitor/ARBs</td>
<td>76%</td>
<td>72%</td>
</tr>
</tbody>
</table>
Primary outcome: Proportion of successful patients

Success at 12 months

- **Intervention (n=360)**
  - Patients with 1 LRF at baseline
  - Patients with 2 LRF at baseline
  - Patients with 3 LRF at baseline
  - Total: 37%

- **Control (n=351)**
  - Patients with 1 LRF at baseline
  - Patients with 2 LRF at baseline
  - Patients with 3 LRF at baseline
  - Total: 26%

- RR = 1.43
- 95% C.I. 1.14-1.78

p = 0.002
## Secondary outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Intervention %</th>
<th>Control %</th>
<th>Rel. Risk (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement in 1 LRF</td>
<td>60</td>
<td>50</td>
<td>1.20 (1.05-1.37)</td>
<td>0.008</td>
</tr>
<tr>
<td>Weight reduction ≥5%</td>
<td>27</td>
<td>14</td>
<td>1.97 (1.44-2.70)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥10% improvement on 6MWD</td>
<td>45</td>
<td>40</td>
<td>1.15 (0.97-1.36)</td>
<td>0.13</td>
</tr>
<tr>
<td>Negative urinary cotinine</td>
<td>76</td>
<td>74</td>
<td>1.03 (0.94-1.12)</td>
<td>0.55</td>
</tr>
<tr>
<td>Systolic BP&lt;140 mmHg</td>
<td>72</td>
<td>67</td>
<td>1.08 (0.98-1.19)</td>
<td>0.12</td>
</tr>
<tr>
<td>LDL-C &lt;70 mg/dl</td>
<td>34</td>
<td>38</td>
<td>0.88 (0.72-1.07)</td>
<td>0.23</td>
</tr>
</tbody>
</table>
Partners

- a. all controls (351)
- b. controls with partner (284)
- c. controls no partner (67)
- d. all interventions (360)
- e. interventions with partner (298)
- f. interventions no partner (62)
- g. all interventions with partner (298)
- h. intervention with participating partner (137)
- i. interventions with nonparticipating partner (161)

P = 0.03
Conclusions

• Nurse-coordinated referral of CAD patients and their partners to a comprehensive set of lifestyle programs improves LRFs significantly more than usual care alone

• Partner participation was associated with a higher rate of success

• This strategy can be easily implemented into daily practice to improve secondary prevention of CAD
# Study group

## Steering committee

- Madelon Minneboo, MD
- Sangeeta Lachman, MD
- Marjolein Snaterse, MSc
- Harald Jørstad, MD, PhD
- Gerben ter Riet, MD PhD
- Matthijs Boekholdt, MD, PhD
- Wilma Scholte op Reimer, PhD
- Ron Peters, MD, PhD, chair

## Centers

1. Atrium MC, Heerlen
2. Beatrix MC, Gorichem
3. Catharina MC, Eindhoven
4. Flevo MC, Almere
5. Gelderse Vallei, Ede
6. Groene Hart MC, Gouda
7. Martini MC, Groningen
8. MC Leeuwarden
9. OLVG MC, Amsterdam
10. Rijnstate MC, Arnhem
11. Slotervaart MC, Amsterdam
12. St Antonius MC, Nieuwegein
13. Tergooi MC, Hilversum
14. Westfries gasthuis, Hoorn
15. AMC, Amsterdam
**deterioration in isolated LRFs**

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<thead>
<tr>
<th></th>
<th>Intervention (n=360)</th>
<th>Control (n=351)</th>
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<tr>
<td>any weight gain</td>
<td>164 (46%)</td>
<td>180 (54%)</td>
</tr>
<tr>
<td>deterioration in 6MWD</td>
<td>77 (21%)</td>
<td>102 (29%)</td>
</tr>
<tr>
<td>urinary cotinine turned +</td>
<td>21 (6%)</td>
<td>14 (4%)</td>
</tr>
</tbody>
</table>
exclusion criteria

- planned revascularization
- life expectancy \( \leq 2 \text{ years} \)
- CHF NYHA class III or IV
- insufficient motivation
- visits and/or lifestyle program not feasible
- no internet access
- Hospital Anxiety and Depression Scale \( >14 \)
### baseline characteristics

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</tr>
<tr>
<td>STEMI</td>
<td>42</td>
<td>39</td>
</tr>
<tr>
<td>Non-STEMI</td>
<td>37</td>
<td>35</td>
</tr>
<tr>
<td>unstable angina</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>stable angina revascularisation</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>PCI</td>
<td>76</td>
<td>80</td>
</tr>
<tr>
<td>CABG</td>
<td>11</td>
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</tr>
</tbody>
</table>
No disclosures