Outcome of a multicenter outpatient weight-management program including very-low-calorie diet and exercise\(^1\textsuperscript{3}\)

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ABSTRACT A 12-wk weight-management program was conducted to test the effectiveness of a combined very-low-calorie diet (VLCD) [2.0 MJ/d (470 kcal/d)] (week 1–5) and exercise (E) program supervised by each patient’s general practitioner and dietitian. Throughout the program, patients’ body mass index measured in kg/m\(^2\) (BMI) 27–35 were encouraged to take part in an individually graded E program of walking (W), cycling (C), running (R), or swimming (S) (Van Bank and Binkhorst 1981). Ninety-four patients (65 female and 29 male, weight: 87.7 kg, BMI: 30.7, age: 39.8 y) completed the program (\(\Delta = 10.6\) kg). At the start, 46% were not involved in any type of physical exercise. After 12 wk only 8% were inactive (Drop out group \((n = 14)\): 47%). Weight loss over 12 wk was significantly \((P < 0.01)\) related to participation rate in the E program. Also, 24-wk follow-up showed a significantly better \((P < 0.05)\) weight maintenance for patients who continued the E program \((+0.4 \text{ vs } 1.8 \text{ kg})\). These data demonstrate the effectiveness of a weight-management program including exercise in primary health care. \textit{Am J Clin Nutr} 1992;56:294S–6S.

KEY WORDS Obesity, very-low-calorie diet, VLCD, exercise, weight loss

Introduction

It has been suggested that exercise plays a special role in weight control. Although the effect during a weight-reduction period is not spectacular, especially in comparison with dietary treatment, it is one of the few factors positively correlated with successful long-term body-weight maintenance (1). Therefore, an outpatient weight management program was designed, including a specially developed exercise program to increase physical fitness (2). Characteristic features of this program are a select walking, running, swimming, or cycling program, with starting intensities related to the individual initial level of fitness, which leads to an improvement of aerobic power between 10% and 20%; and a point score, which can be used as a guideline to estimate the value of the total energy cost of the training program with different combinations of intensity, frequency, and duration.

The aim of the present study was to test the effectiveness of a combined very-low-calorie diet (VLCD) diet [1970 kJ/d (470 kcal/d)] and exercise program supervised by each patient’s general practitioner (GP) and dietitian.

Methods

Twelve GPs in three different regions participated. In each region dietitians (total \(n = 7\)) were selected to form a team with the GP. Each GP recruited patients who were interested to take part in the study. The selection criteria used were age, 20–50 y; body mass index (BMI), 27–35; and no contraindications for starting VLCD treatment.

During the first visit to the GP, medical history was recorded, including weight, height, blood pressure, and medication. During the visits at weeks 2–5 and 12 the treatment was evaluated including blood pressure. In weeks 0, 3, and 12, blood samples were taken for total cholesterol determination. During the first visit to the dietitian, the habitual food intake was recorded, weight, height, waist-hip ratio, and four skinfold thicknesses (biceps, triceps, supra iliac, iliac crest) were measured. Information about the VLCD diet and exercise program was given. During the following visits the measurements were repeated. In weeks 2–4, special attention was given to the exercise program. In weeks 5–9, attention was focused on the change in nutritional habits and relapse prevention. Written information about VLCD diet, exercise program, personal food and exercise diary, relapse prevention, food table, and personal weight table was given to the patient and discussed. After 24 wk a follow-up measurement was scheduled. (The protocol was approved by the medical ethics committee of the University of Limburg.)

Results

Ninety-four patients (65 female and 29 male, \(x \pm SD\), weight: 87.7 \(\pm\) 11.6 kg, BMI: 30.7 \(\pm\) 3.3, age: 39.8 \(\pm\) 10.8 y) completed the program. Weight loss after 5 and 12 wk was 8.2 and 10.6 kg, respectively (Fig 1). Fourteen patients dropped out (initial weight 85.7 kg, BMI 30.1, \(\Delta = 1.1\) ). At the start 46% were not involved in any type of physical exercise. At 12 wk only 8% were inactive (drop-out group: 47%). Participation rate in the walking, cycling, running, or swimming program or other types of activities was 29%, 38%, 7%, 8%, and 10%, respectively. Participation rate in the exercise program in the group with the highest weight loss was significantly \((P < 0.05)\) better than in the lowest weight-loss group (Table 1). However, the exercise time over 12 wk was not related to weight loss \((\text{group } < 18 \text{ h/week})\).

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FIG 1. Mean changes over the 24-wk period for weight, body fatness, blood pressure, and total cholesterol.

12 wk ($n = 34; \bar{x} = 8.4 \text{ h})$ vs group $>$ 38 h/12 wk ($n = 29; \bar{x} = 68.1 \text{ h}$), \(\Delta\) kg: $-11.6 \text{ kg and } -9.7 \text{ kg}$, respectively. Patients who continued the exercise program in the 3-mo follow-up showed a significantly ($P < 0.05$) better weight maintenance (Table 2). Thirty-one patients with hypertension (initial: systolic $147 \pm 18$, diastolic $95 \pm 10 \text{ mm Hg}$, 54% with medication) compared with the normotensive group showed a similar reduction in \(\Delta\) kg ($-10.9$), \(\Delta\) systolic ($-14.1$), \(\Delta\) diastolic ($-8.8$), and exercise participation (94%). Forty-five percent stopped or decreased medication.

**Discussion**

These data demonstrate the effectiveness of a weight-management program in primary health care. The combination of a VLCD diet, nutritional and behavior counseling, and an exercise program was well accepted. Nearly all patients took part in one of the self-selected exercise programs. Walking and cycling were the most favorite types of activities. Although sport participation was related to the rate of weight loss, it turned out that the total exercise duration was not. It is

| TABLE 1 | Characteristics of the groups with different weight changes over 12 wk |
|---------|-----------------|-----------------|-----------------|---------------|---------------|
| Group   | Age ($\bar{x}$) | $\Delta$ Weight | $\Delta$ Systolic pressure | Sport participation | $\Delta$ Cholesterol |
|         | $\text{kg}$     | $\text{kg}$     | $\text{mm Hg}$       | $\%$          | $\text{mmol/L}$ |
| 1 < $\bar{x} - \text{SD}$ ($n = 13$) | 41.7             | $-4.6$          | $-10.6$           | 77            | $-0.1$         |
| 2 $\bar{x} - \text{SD}$ ($n = 37$)    | 38.4             | $-8.9$          | $-7.8$            | 81            | $-0.4$         |
| 3 $\bar{x} + \text{SD}$ ($n = 30$)    | 42.6             | $-12.4$         | $-13.9$           | 87            | $-0.7$         |
| 4 > $\bar{x} + \text{SD}$ ($n = 14$)  | 36.0             | $-16.8$         | $-9.6$            | 100           | $-1.2$         |

Student t test: 1 vs 4

* $P < 0.05$.
† $P < 0.01$.
‡ $P < 0.001$. 
TABLE 2
Follow-up after 24 wk: characteristics of the groups with different duration of sport participation at week 24

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>Δ Weight</th>
<th>Sport participation:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>y kg</td>
<td>h/wk</td>
</tr>
<tr>
<td>1 &lt; 3.8 h/wk (n = 52)</td>
<td>38.6</td>
<td>10.3</td>
<td>1.8</td>
</tr>
<tr>
<td>2 3.8–7.5 h/wk (n = 27)</td>
<td>41.1</td>
<td>11.7</td>
<td>2.1</td>
</tr>
<tr>
<td>3 &gt; 7.5 h/wk (n = 13)</td>
<td>44.4</td>
<td>11.1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Student t test: 1 vs 3

* P < 0.05.
† P < 0.001.

It is interesting to note that in the 3-mo follow-up sport participation decreased drastically. However, those who continued their physical exercise pattern at a high level showed a significantly better weight maintenance. Poor adherence to exercise activities is not unique for obese individuals and it was suggested by Brownell et al (3) that changing routine activities should result in a better long-term adherence.

References