Anthropometric, Metabolic, Psychosocial, and Dietary Characteristics of Overweight/Obese Postmenopausal Women with a History of Weight Cycling: A MONET (Montreal Ottawa New Emerging Team) Study

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ABSTRACT
Characteristics of weight cyclers have not been fully assessed. The objective of this study was to determine the anthropometric, metabolic, psychosocial, and dietary profile of postmenopausal women according to weight-cycling history, defined as the frequency of going on a diet and losing >10 kg: never (0 times), low (1 time), moderate (2 to 3 times), or frequent (≥4 times). The sample of this cross-sectional study consisted of 121 overweight/obese postmenopausal women enrolled in a 6-month randomized weight-loss intervention between 2003 and 2006. Measures at baseline were used to evaluate body composition (fat mass by dual-energy x-ray absorptiometry and visceral fat by computed tomography); resting metabolic rate by indirect calorimetry; insulin sensitivity by hyperinsulinemic-euglycemic clamp; fasting plasma levels of glucose, lipids, leptin, ghrelin, and adiponectin; blood pressure; psychosocial profile (eg, body-esteem, self-esteem, stress, perceived risks, perceived benefits, self-efficacy, quality of life, dietary restraint, disinhibition, hunger); and dietary profile (3-day food record). Differences among groups of weight cyclers were determined using analyses of variance. Among the 121 women, 15.7%, 24.8%, 33.9%, and 25.6% were non-, low, moderate, and frequent cyclers, respectively. Frequent cyclers were characterized by higher body mass index (calculated as kg/m²) (current and at 25 years of age) and percent body fat mass, larger waist circumference, and lower resting metabolic rate/kg body weight than noncyclers (P<0.05); and moderate cyclers had lower plasma adiponectin values than noncyclers (P<0.05). For psychosocial measures, frequent cyclers were characterized by greater disinhibition and lower body esteem after controlling for body mass index (P<0.05). In conclusion, weight cycling was found to be associated with some unfavorable metabolic and psychosocial parameters.
onary heart disease, all-cause mortality (11,15,18), and with reduced quality of life, independent of body mass index (BMI) (10). Obese individuals with large fluctuations in body weight have greater taste preference for sugar and fat (22) and are more prone to future weight gain (23).

In contrast, other studies have not reported adverse consequences of weight cycling. For example, weight cycling was not an independent predictor of preeclampsia (24), hypertension (25), or type 2 diabetes (9). Absence of detrimental effects of weight cycling on body composition, fat distribution, energy expenditure, and blood lipids (26-28), as well as psychological health (29-32), have been reported. Discrepancies in results might be related to different definitions of weight cycling and lack of control for confounding factors.

Few studies have examined dietary aspects of weight cycling (33,34). This study extends and further characterizes the anthropometric, metabolic, psychosocial, and dietary profile of individuals with a history of losing a large amount of weight (>10 kg or 22 lb), in a group of sedentary overweight/obese postmenopausal women. No study has previously examined this comprehensive set of characteristics within the same group of women. The study hypothesis is as follows: women without a history of weight cycling will have a more favorable anthropometric, metabolic, psychosocial, and dietary profile.

**METHODS**

The study sample of this cross-sectional study was drawn from 137 sedentary, overweight, and obese postmenopausal women enrolled in a 6-month weight-loss intervention (randomized diet with or without resistance training). Subjects were recruited by newspaper advertisements. The study was approved by the Université de Montréal, Faculty of Medicine Ethics Committee. Data were collected from 2003 to 2006. Women were eligible to participate if they met the following criteria: cessation of menstruation >1 year; no use of hormone replacement therapy; sedentary (<2 hours/week of structured exercise); nonsmokers; free of known inflammatory disease; BMI ≥27. Participants had no evidence of cardiovascular or peripheral vascular diseases, stroke, diabetes, hypertension, orthopedic limitations, and medication for metabolic conditions. Three weeks prior to testing, body weight was monitored on a weekly basis to ensure that it was stable within ±2 kg. Participants were then invited to the metabolic unit to evaluate anthropometric, metabolic, psychosocial, and dietary profiles. The data presented in this article represent baseline characteristics of participants. Of the initial 137 women, 121 provided complete information about weight-cycling history and were included in these analyses.

**Anthropometric Assessment**

Body weight, lean body mass, and fat mass were measured using dual-energy x-ray absorptiometry, and visceral fat by computed tomography, as described previously (35). Subjects wore light clothing for these measurements. Standing height was measured to the nearest 0.1 cm with a wall stadiometer (Perspective Enterprises, Portage, MI).

BMI was calculated as kg/m². Waist circumference (mean of two measures) was determined using a Gulick tape at the mid-distance between the lowest rib and the iliac crest.

**Metabolic Assessment**

Resting metabolic rate (RMR) and fasting respiratory quotient were measured by indirect calorimetry after the subjects fasted overnight for 12 hours. Subjects were instructed to fast and drink only water for 12 hours before testing, consume no alcohol, refrain from physical activity for 24 hours before testing, and keep physical activity to a minimum on the morning of the test. Concentrations of CO₂ and O₂ were measured using the ventilated hood technique with a SensorMedics Delta Track II (Datex-Ohmeda, Helsinki, Finland). Measurements were performed during 40 minutes, the first 10 minutes were considered as an acclimatization period and the last 30 minutes were used for analyses. Measurement of gas concentrations at rest were then used to extrapolate 24-hour RMR using Weir’s equation. In our laboratory, the intraclass correlation coefficient (two-factor random effect) for RMR determined by using a test-retest condition in 19 different subjects was 0.92 (P<0.001). Insulin sensitivity was measured by the hyperinsulinemic-euglycemic clamp technique, with an insulin infusion rate of 75 mU/m²min for 180 minutes; glucose disposal was calculated as described previously (35) and expressed as mg×min⁻¹ per kg free fat mass. Venous plasma glucose levels were determined during an oral glucose tolerance test (75 g) at fasting and at 2 hours. Blood pressure was measured and fasting plasma lipid levels of total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and triglycerides were determined (35). Fasting plasma concentrations of leptin, total ghrelin, and adiponectin were measured in a subsample in duplicate with a commercial radioimmunoassay procedure, as described previously (36).

**Psychosocial Factors**

Psychosocial factors were assessed using the following measures: Perceived Stress Scale (37); Self-Esteem Scale (38); Body-Esteem Scale (39), including appearance, attribution, and weight subscales; Perceived Risk for developing heart disease and for diabetes, developed according to the Health Belief Model (40); Perceived Benefits for controlling weight, developed according to the Health Belief Model (40); Self-efficacy for controlling weight, developed according to Social Cognitive Theory (41); Medical Outcomes Study General Health Survey (42,43) quality-of-life measure, including health perceptions, mental health, role functioning, social functioning, physical functioning, and pain subscales; the 3-Factor Eating Questionnaire (44), including dietary restraint, disinhibition, and hunger factors. Internal consistency reliability was assessed using Cronbach α coefficients (45) for measures developed for this study with two or more items: .74 for "perceived benefits for controlling weight" and .73 for "self-efficacy for controlling weight."
Nutrient Intakes
Food intake was assessed using a 3-day food record (46) at baseline during the weight-stabilization period. Subjects were instructed by a registered dietitian (RD) to keep a record of food intake, including condiments and beverages, during 2 weekdays and 1 weekend day while maintaining their usual habits. On their return, each food record was reviewed by the RD with the subject to complete missing information. Analyses were conducted with the Food Processor SQL program (Food Processor SQL Edition, version 9.6.2. 2004; ESHA Research, Salem, OR) using the 2001 Canadian Nutrient Data File. Data entry of the food records was done by an RD and independently verified by a second one. Discrepancies between the two RDs were discussed and modifications were made according to their mutual decision. Mean intake of 3 days for percent of energy from carbohydrates, protein, and fat were calculated for each subject.

Weight-Cycling Profile
A large weight gain (23) was assessed by asking the question “How many times in your lifetime have you gone on a diet and lost more than 10 kilograms?” Response categories included: “never,” “once,” “two to three times,” “four to five times,” and “more than five times.” Because only nine women responded “four to five times,” the last two categories were regrouped as “four or more times.”

Other Measures
Age, education (university education/less than university education), yearly household income (<$50,000/=$50,000), marital status (living with spouse-partner/living alone), and weight at 25 years of age (self-report) were determined. BMI at 25 years of age was calculated using self-reported weight (kg) at 25 years of age divided by current height (m)².

Statistical Analysis
The Statistical Package for the Social Sciences program (SPSS, version 15, 2006, Chicago, IL) was used for statistical analyses. Descriptive statistics were expressed as mean±standard deviation (SD). \( \chi^2 \) were conducted to determine differences between education, household income, and marital status with weight-cycling history. For age, anthropometric, metabolic, psychosocial, and dietary variables, a one-way analysis of variance was performed to analyze mean differences among the four groups of weight cycling; a Tukey post hoc test was performed to identify group differences. For variables that were found to be statistically significant, analyses of covariance (univariate general linear model) were conducted to control for BMI. Significance was accepted as \( P\leq0.05 \). Analyses are based on 121 subjects; cases where numbers reported are <121 indicate that women did not answer all questions.

RESULTS AND DISCUSSION
In this sample of 121 overweight/obese postmenopausal women seeking treatment for weight loss, participants had a mean age of 58 years (SD=5 years), wherein 59.8% (67 of 112) were university-educated, 53.5% (61 of 114) were living with a spouse-partner, and 58.1% (61 of 105) had a household income ≥$50,000. In these women, 15.7% (19 of 121) were noncyclers, 24.8% (30 of 121) reported cycling one time, 33.9% (41 of 121) two to three times, and 25.6% (31 of 121) four or more times. The phenomenon of weight cycling was, therefore, a common occurrence, with approximately 60% of women having engaged in cycling two or more times in their lifetime. Only 16% of women reported being noncyclers, a rate lower than that found in population-based studies (6-8). This was likely a result of the composition of the study sample and the definition of weight cycling as a large amount of weight loss, ie, >10 kg per episode.

For sociodemographic characteristics, there were no significant differences among weight-cycling groups for level of education, income, or age; however, noncyclers were more likely to report living with a spouse-partner (\( P=0.013 \)).

For anthropometric factors, there were statistically significant differences among groups of weight cyclers for BMI (\( P<0.001 \), fat mass (\( P=0.04 \)), and waist circumference (\( P=0.003 \)) (Table 1). Frequent cyclers were more likely to have higher BMI and body fat mass than noncyclers, although the causal path of this association is not known, a result of our cross-sectional study design. Self-reported BMI at 25 years of age was also associated with weight-cycling history (\( P=0.001 \)). These results are similar to those of the Nurses’ Health Study II (9), where weight cycling was associated with reported BMI at 18 years of age: noncyclers, mild cyclers, and severe cyclers had a mean BMI of 20.9 (SD=3), 22.9 (SD=4), and 24.4 (SD=5), respectively. Young adults with a normal BMI at the upper end of the range may be at higher risk for weight gain and weight cycling than individuals at the lower range of normal BMI (47). Obesity-prevention programs targeting such individuals in young adulthood may be warranted.

For metabolic factors, no significant differences among groups of weight cyclers were found for blood pressure, glucose values, insulin sensitivity, respiratory quotient, or RMR (even when controlling for lean body mass). However, when RMR was divided by kg body weight, noncyclers and one-time cyclers had significantly higher RMR/kg body weight than frequent cyclers (\( P=0.003 \)). An interesting finding of this study is that frequent weight cyclers may be characterized by reduced relative energy expenditure. Although absolute RMR did not differ, lower RMR/kg body weight might support the notion that some individuals may become resistant to slimming following repeated exposure to weight-loss interventions (48). However, because data are cross-sectional, causality cannot be established. Other studies have shown that body-weight loss causes greater than expected reduction in energy expenditure (49,50), which may persist in the weight-reduced state (51). High RMR of energy expenditure predict long-term successful weight loss (52), whereas low RMR of energy expenditure predict weight gain and regain (53).

Adiponectin, but not leptin and ghrelin, was associated with weight cycling (\( P=0.04 \); this association remained statistically significant after controlling for fat mass. Noncyclers had higher plasma adiponectin values than
Table 1. Anthropometric and metabolic characteristics of overweight/obese postmenopausal women, according to weight-cycling history

<table>
<thead>
<tr>
<th>Factors</th>
<th>Total (n=121)</th>
<th>Group 1 (n=19) noncycler (never)</th>
<th>Group 2 (n=30) low cycler (1 time)</th>
<th>Group 3 (n=41) moderate cycler (2-3 times)</th>
<th>Group 4 (n=31) frequent cycler (≥4 times)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body weight (kg)</strong></td>
<td>83.7±14.0</td>
<td>78.0±10.3a</td>
<td>77.9±8.8b</td>
<td>83.5±12.6c</td>
<td>92.9±17.1abc</td>
<td>&lt;0.001</td>
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<tr>
<td><strong>BMI</strong></td>
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<tr>
<td>Current</td>
<td>32.6±4.7</td>
<td>30.4±4.7a</td>
<td>30.8±3.1b</td>
<td>32.9±4.6</td>
<td>35.2±5.1ab</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>At 25 years</td>
<td>22.5±2.8</td>
<td>21.4±2.3a</td>
<td>21.5±1.6b</td>
<td>22.4±2.1c</td>
<td>24.1±4.0abc</td>
<td>0.001</td>
</tr>
<tr>
<td>LBM (kg)</td>
<td>42.5±6.4</td>
<td>41.0±4.7a</td>
<td>40.3±3.9b</td>
<td>42.2±6.3</td>
<td>45.8±8.0ab</td>
<td>0.004</td>
</tr>
<tr>
<td>LBM (%)</td>
<td>51.1±4.7</td>
<td>53.0±4.9</td>
<td>51.9±4.3</td>
<td>50.8±4.9</td>
<td>49.6±4.4</td>
<td>0.06</td>
</tr>
<tr>
<td>FM (kg)</td>
<td>38.8±9.4</td>
<td>34.6±8.2a</td>
<td>35.3±6.6b</td>
<td>38.8±8.5c</td>
<td>44.6±10.8abc</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FM (%)</td>
<td>45.9±4.8</td>
<td>44.0±5.0a</td>
<td>45.0±4.4</td>
<td>46.2±4.9</td>
<td>47.7±4.5a</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>VFg (cm²)</strong></td>
<td>184.9±55.3</td>
<td>166.0±40.6</td>
<td>170.6±49.8</td>
<td>193.7±60.2</td>
<td>199.2±57.2a</td>
<td>0.06</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>103.7±11.5</td>
<td>99.4±0.0a</td>
<td>99.8±9.4b</td>
<td>104.4±10.5</td>
<td>109.2±13.1abc</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Plasma glucose (mmol/L)</strong></td>
<td>5.00 ± 0.6</td>
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<tr>
<td><strong>Hormones</strong></td>
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<tr>
<td>Leptin (mg/mL) (n=62)</td>
<td>27.8±9.6</td>
<td>24.7±5.5</td>
<td>27.0±8.2</td>
<td>27.4±11.2</td>
<td>31.7±9.9</td>
<td>0.33</td>
</tr>
<tr>
<td>Ghrelin (pg/mL) (n=53)</td>
<td>1,178±411</td>
<td>960±392</td>
<td>1,332±409</td>
<td>1,244±397</td>
<td>1,130±414</td>
<td>0.16</td>
</tr>
<tr>
<td>Adiponectin (µg/mL) (n=49)</td>
<td>9.6±5.0</td>
<td>13.6±9.0a</td>
<td>9.9±3.6</td>
<td>7.7±2.9a</td>
<td>8.8±2.9</td>
<td>0.04</td>
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<tr>
<td><strong>Blood pressure (mm Hg)</strong></td>
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<tr>
<td>Systolic</td>
<td>121.0±14.0</td>
<td>118.6±8.3</td>
<td>118.7±13.0</td>
<td>125.3±16.4</td>
<td>119.1±13.5</td>
<td>0.12</td>
</tr>
<tr>
<td>Diastolic</td>
<td>76.1±7.9</td>
<td>75.9±5.6</td>
<td>75.5±7.9</td>
<td>77.6±9.2</td>
<td>75.0±7.5</td>
<td>0.54</td>
</tr>
</tbody>
</table>

aGroup 1 is significantly different from group 4 (P<0.05).
bGroup 2 is significantly different from group 4 (P<0.05).
cGroup 3 is significantly different from group 4 (P<0.05).
dBMI = body mass index.
eLBM = lean body mass.
fFM = fat mass.
gVF = visceral fat.
hRMR = resting metabolic rate.
RO = respiratory quotient.
iFFM = fat-free mass.

To convert mg/dL glucose to mmol/L, multiply mg/dL by 0.0555. Glucose of 6.0 mmol/L = 108 mg/dL.
To convert mg/dL cholesterol to mmol/L, multiply mg/dL by 0.026. To convert mmol/L cholesterol to mg/dL, multiply mmol/L by 38.7. Cholesterol of 193 mg/dL = 5.00 mmol/L.
To convert mg/dL HDL-C to mmol/L, multiply mg/dL by 0.026. To convert mmol/L HDL-C to mg/dL, multiply mmol/L by 38.7. HDL-C of 193 mg/dL = 5.00 mmol/L.
To convert mg/dL LDL-C to mmol/L, multiply mg/dL by 0.026. To convert mmol/L LDL-C to mg/dL, multiply mmol/L by 38.7. LDL-C of 193 mg/dL = 5.00 mmol/L.

April 2009 ● Journal of the AMERICAN DIETETIC ASSOCIATION 721
Table 2. Psychosocial characteristics of overweight/obese postmenopausal women, according to weight-cycling history

<table>
<thead>
<tr>
<th>Factorsa</th>
<th>Total (n=19)</th>
<th>Group 1 (n=30) noncycler (never)</th>
<th>Group 2 (n=41) low cycler (1 time)</th>
<th>Group 3 (n=41) moderate cycler (2-3 times)</th>
<th>Group 4 (n=31) frequent cycler (≥4 times)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy (1-4) (n=119)</td>
<td>2.7±0.5</td>
<td>2.7±0.7</td>
<td>2.6±0.5</td>
<td>2.9±0.5b</td>
<td>2.5±0.5b</td>
<td>0.04</td>
</tr>
<tr>
<td>Perceived benefits (1-4) (n=115)</td>
<td>3.7±0.4</td>
<td>3.7±0.5</td>
<td>3.6±0.3</td>
<td>3.7±0.3</td>
<td>3.7±0.4</td>
<td>0.74</td>
</tr>
<tr>
<td>Perceived risk for:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Heart disease (1-4) (n=120)</td>
<td>2.9±0.9</td>
<td>2.7±0.9</td>
<td>2.5±0.7d</td>
<td>3.0±0.9</td>
<td>3.1±0.9c</td>
<td>0.04</td>
</tr>
<tr>
<td>Diabetes (1-4) (n=120)</td>
<td>2.8±0.9</td>
<td>2.5±1.0</td>
<td>2.6±0.7</td>
<td>2.9±1.0</td>
<td>3.1±1.0</td>
<td>0.09</td>
</tr>
<tr>
<td>Stress (0-56) (n=118)</td>
<td>18.9±8.1</td>
<td>18.1±9.6</td>
<td>19.3±6.6</td>
<td>20.0±8.5</td>
<td>17.7±8.0</td>
<td>0.64</td>
</tr>
<tr>
<td>Self-esteem (1-4) (n=121)</td>
<td>1.8±0.5</td>
<td>1.7±0.5</td>
<td>1.9±0.5</td>
<td>1.8±0.4</td>
<td>1.9±0.5</td>
<td>0.59</td>
</tr>
<tr>
<td>Body-esteem (0-4) (n=104)</td>
<td>1.4±0.5</td>
<td>1.7±0.5d</td>
<td>1.4±0.5</td>
<td>1.5±0.5</td>
<td>1.2±0.4d</td>
<td>0.002</td>
</tr>
<tr>
<td>Appearance (n=120)</td>
<td>1.6±0.6</td>
<td>1.9±0.6d</td>
<td>1.6±0.6</td>
<td>1.6±0.7b</td>
<td>1.2±0.5bcd</td>
<td>0.002</td>
</tr>
<tr>
<td>Weight (n=119)</td>
<td>1.0±0.6</td>
<td>1.3±0.5d</td>
<td>1.0±0.6</td>
<td>1.0±0.6</td>
<td>0.8±0.4d</td>
<td>0.01</td>
</tr>
<tr>
<td>Attribution (n=104)</td>
<td>1.9±0.6</td>
<td>1.9±0.5</td>
<td>1.9±0.5</td>
<td>2.0±0.6</td>
<td>1.9±0.5</td>
<td>0.63</td>
</tr>
</tbody>
</table>

3-Factor Eating Questionnaire

- Restraint (0-21) (n=108) 11.1±3.8 11.7±3.9 10.8±3.8 10.9±3.7 11.3±3.9 0.90
- Disinhibition (0-16) (n=119) 8.3±3.5 6.4±3.0d 7.4±3.0d 8.1±3.7b 10.4±3.1bcd <0.001
- Hunger (0-14) (n=114) 5.4±3.0 5.4±2.6 5.7±3.0 5.3±3.0 5.2±3.4 0.92

Quality of life (0-100%) (n=114) 79±14 84±12 78±14 78±15 78±12 0.48

- Physical functioning (n=118) 81±24 90±13 85±21 75±29 80±22 0.13
- Pain (n=121) 59±31 66±31 54±32 58±31 60±28 0.62
- Social functioning (n=120) 96±11 99±5 97±9 95±12 95±16 0.58
- Role functioning (n=120) 86±25 93±16 84±29 87±25 84±27 0.57
- Mental health (n=121) 70±15 71±16 69±13 68±17 73±15 0.48
- Health perceptions (n=117) 77±18 81±17 77±19 76±19 78±16 0.83

aHigher scores indicate greater self-efficacy, greater perceived benefits, greater perceived risk, greater stress, lower self-esteem, higher body-esteem, greater dietary restraint, greater disinhibition, greater hunger, and greater quality of life.
bGroup 3 is significantly different from group 4 (P<0.05).
cGroup 2 is significantly different from group 4 (P<0.05).
dGroup 1 is significantly different from group 4 (P<0.05).

moderate cyclers, a puzzling observation because adiponectin was not associated with either plasma glucose levels or insulin sensitivity, as might have been expected (54). Lower levels of adiponectin have been reported to be associated with the development of type 2 diabetes (55). In line with some (9,25-27), but not all (15,18), previous studies, the current data do not support adverse effects of weight cycling on classical variables associated with cardiovascular risk profile.

For psychosocial factors, weight cycling was associated with self-efficacy (P=0.04), perceived risk for heart disease (P=0.04), body-esteem (P=0.02), and disinhibition (P<0.001) (Table 2). After controlling for BMI, differences among groups of weight cyclers for self-efficacy (P=0.049), body-esteem appearance subscale (P=0.03), and disinhibition remained statistically significant (P=0.004). These results are similar to the Québec Family Study, where past-dieting women had higher scores than nondieters for disinhibition, that is, overconsumption of food in response to cognitive or emotional cues (34). Because the majority of women seeking weight-loss treatment in the current study had a previous history of weight cycling and because disinhibition scores were independently associated with weight cycling, consideration needs to be given to cognitive and behavioral aspects (56,57) to reduce overconsumption of foods by postmenopausal women in problematic situations. Moreover, frequent weight cycling was associated with lower esteem of body appearance, suggesting a possible link between psychological factors and weight cycling. Weight cycling may have long-term negative effects on body-appearance esteem, beyond those already noted for BMI.

Mean nutrient intakes of participants were similar in the four study groups, where percent of energy from carbohydrate, protein, and total fat were of the order of 48%, 17%, and 32% (10.5% saturated fat, 11% monounsaturated fat, and 5% polyunsaturated fat), respectively. Only 68% (82 of 121) of respondents volunteered to return the 3-day food records with complete information. This low return rate may explain why there were no substantial associations between nutrient intakes and weight-cycling history. Provancher and colleagues (34) reported that women with a past history of dieting were more likely to have a higher-fat and lower-carbohydrate pattern than nondieters.

There are several study limitations. Data on weight cycling were based on self-reported episodes and were collected retrospectively: no cause-and-effect can be established. Furthermore, the study sample is not representative of postmenopausal women, but limited to a selected group seeking treatment in an intense structured weight-loss research program. However, these
study results are supported by use of gold-standard techniques for anthropometric and metabolic assessment in a well-characterized cohort that examined large intentional weight loss (>10 kg).

CONCLUSIONS

Weight cycling was found to be associated with some unfavorable metabolic and psychosocial parameters, but not others. Postmenopausal women with a history of weight cycling need to pay attention to the amount of food consumed in response to situational and emotional cues triggering overeating. A problem-solving cognitive approach (53,54) may be useful in assisting women in managing such situations. Research is needed to determine the links between weight cycling and dietary patterns as well as the effects of weight-loss methods on such patterns.

This research was funded by a Canadian Institutes of Health Research (CIHR) New Emerging Team Grant from the Institute of Nutrition and Metabolism and Institute of Gender and Health. One of the authors is a recipient of a CIHR/Merck research scholar of the Fonds de Recherche en Santé du Québec and has received support from the Fondation du CHUM. Another author is a recipient of a CIHR/Merck-Frost New Investigator Award, a Canadian Foundation for Innovation New Opportunities Award, and an Ontario Early Researcher Award.

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