

# OBESITY IN WOMEN

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Obesity rates are reaching epidemic proportions in the United States and other industrialized nations. In the United States, 34.1% of the population is overweight (defined as a BMI of 25-29.9 kg/m<sup>2</sup>), while 31.1% are obese (BMI > 30 kg/m<sup>2</sup>). Obesity affects 34.0% of women and 28.1% of men. Non-Hispanic black women have the highest rates of obesity: nearly half are obese. (Table 1) Obesity is six times more prevalent among women of low as compared with high socioeconomic status.

Obesity causes, exacerbates, and predisposes to many diseases affecting women, including heart disease, breast and endometrial cancers, diabetes, urinary incontinence, and arthritis.<sup>1</sup> Weight gain in women during adult life is associated with increased risk of heart disease and death.<sup>1,2</sup> Even modest weight gains after age 18 dramatically increase the risk for the development of diabetes.<sup>2,3</sup>

Fortunately, modest weight losses of 5%-10% of body weight are sufficient to control, or at least improve, most complications of obesity. Improvements in blood pressure, serum triglycerides, high-density lipoprotein-cholesterol, low-density lipoprotein-cholesterol, blood glucose levels, sleep apnea, osteoarthritis, and gout are observed. In a recent large-scale study, increased physical activity and loss of 7 kg prevented or delayed the onset of type 2 diabetes in individuals with impaired glucose tolerance. Participants who were assigned to lifestyle intervention reduced their risk of developing type 2 diabetes by 58%. Participants receiving standard care plus pharmacotherapy (metformin) reduced their risk of type 2 diabetes by 31%; lifestyle intervention was twice as effective as medication.

## KEY COMPONENTS OF SUCCESSFUL WEIGHT CONTROL

Much of what we know about lifestyle change to promote successful

weight loss is derived from the **National Weight Control Registry (NWCR)** data. The NWCR is a registry of individuals who have successfully maintained a loss of at least 13.6 kg for at least 1 year.<sup>4</sup> However, the 5,000 participants in the NWCR have far exceeded these minimum criteria; on average, they have lost almost 70 lb and kept it off for 6 years. Research from the NWCR and randomized controlled trials have identified several key lifestyle changes for long-term successful weight control. (Table 2) These include consumption of a low calorie, low fat diet, engaging in high

1500 kcal/day for women and 1500-1800 for men are recommended, with fat intake <30% of calories. Data from the NWCR support these low calorie, low fat recommendations. In addition, 78% of registry members reported eating breakfast every day of the week. Maintaining consistency in the diet also appears to be a key characteristic of NWCR participants; most participants reported that their eating was the same on weekends and weekdays and on holidays/vacations and the rest of the year.

Recently, there has been renewed interest in diets that severely restrict carbohydrate intake, like the Atkins' and South Beach diets. Such diets are only beginning to be formally evaluated in weight loss trials. Short-term evaluations have found significantly greater weight losses with low carbohydrate regimens relative to low fat, low calorie regimens. Two long-term evaluations of low carbohydrate diets found no significant differences relative to low-fat diet controls at 1 year.<sup>5,6</sup> Although low-carbohydrate dieters are often allowed to eat as much protein and fat as they desire, the average intake on these regimens is approximately 1500 kcal/day; this reduced calorie intake is responsible for the weight loss seen on these regimens.

*Self-monitoring of body weight, food intake, and physical activity.* Self-

**“... MODEST WEIGHT LOSSES OF 5% -10% OF BODY WEIGHT ARE SUFFICIENT TO CONTROL, OR AT LEAST IMPROVE, MOST COMPLICATIONS OF OBESITY.”**

levels of physical activity, and self-monitoring.

*Consumption of a low calorie, low fat diet.* Although the optimal degree of caloric restriction remains unclear, typically diets of approximately 1200-

**Table 1. Proportion of Women Overweight or Obese**  
(Females aged 20 to 74 years by race and Hispanic origin, 1999–2002)

Race/Ethnicity	Overweight (BMI greater than or equal to 25)	Obese (BMI greater than or equal to 30)
White (non-Hispanic)	57.0%	31.3%
African American/Black (non-Hispanic)	77.5%	49.6%
Mexican American	71.4%	38.9%

Age adjusted to the U.S. year 2002 standard population.  
Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, *Health, United States, 2002*.

**Table 2.** Key Strategies for Long Term Successful Weight Loss

Consume a low calorie diet	1200-1500 kcal/day for women 1500-1800 kcal/day for men
Consume a low fat diet	<30% kcal/day from fat
Consume breakfast	Eat breakfast daily
Increase physical activity	Goal of 60 minutes/day
Self-monitor weight, intake, and exercise	Record daily

monitoring appears to be another important ongoing strategy for successful weight loss. Seventy-five percent of members in the NWCR weighed themselves at least once per week, and 44% weighed themselves daily. Additionally, 50% of registry members reported that they still occasionally counted calories, fat grams, or both. Other treatment studies have confirmed the role of self-monitoring in successful weight management. Notably, self-monitoring is often not totally accurate; in fact, estimates of dietary intake obtained from such recording underestimate actual intake by 30% on average. Therefore, this technique should be viewed more as a behavior change tool than as an assessment technique.

*Engaging in High Levels of Physical Activity.* Correlational studies, as well

as controlled trials, show consistently that persons who engage in regular physical activity are the ones most likely to maintain a reduced weight. Almost all participants (91%) in the NWCR reported engaging in regular physical activity. On average, women in the registry reported that they engaged in 2545 kcal/week of physical activity and men engaged in an average of 3293 kcal/week in physical activity. This amount of physical activity is comparable to walking about 28 miles/week or about an hour per day of moderate intensity physical activity. This amount of physical activity is also consistent with the **United States Department of Agriculture's (USDA)** recommendations for the general public. The USDA recommends that adults engage in 60 to 90 minutes/day of moderate intensity physical activity

to sustain weight loss in adulthood. Most NWCR subjects meet this recommendation.

Results of other studies support the recommendation for high levels of physical activity and suggest that high levels may be necessary to prevent weight regain after weight loss. Jakicic et al.<sup>8</sup> reported that greater levels of physical activity had minimal impact on 6-mo weight loss in women who were reducing energy intake. However, the higher amounts of exercise appeared to be more effective for prevention of weight regain. It was reported that women engaging in ~280 min/wk of at least moderate intensity physical activity (i.e., brisk walking) throughout the 18-mo study reduced their body weight by 13 ± 8.0 kg, whereas exercising <200 min/wk or <150 min/wk resulted in weight loss of 8.5 ± 5.8 and 3.5 ± 6.5 kg, respectively.

Dividing physical activity into multiple 10-min bouts may facilitate initial adoption of activity in previously sedentary women. Home-based exercise programs and the use of home exercise equipment may also enhance exercise adherence and improve the maintenance of weight loss.

**TREATMENTS SPECIFIC FOR WOMEN**

Several treatments have been tailored to address weight concerns of women. Although the basic elements of treatment are consistent with standard weight control practices (i.e., modifying diet, physical activity, and self-monitoring), the timing and structure of treatment may be tailored to address the needs of women.


*Pregnancy* One period when obesity prevention efforts may be particularly effective for women is the period surrounding pregnancy. Although studies of the general population have reported average weight gains of only 0.4 to 3.8 kg more than aging, approximately 25% of women experience a weight gain of 4.5 kg or more with pregnancy. Moreover, weight changes during pregnancy are strongly related to subsequent weight change and future obesity.

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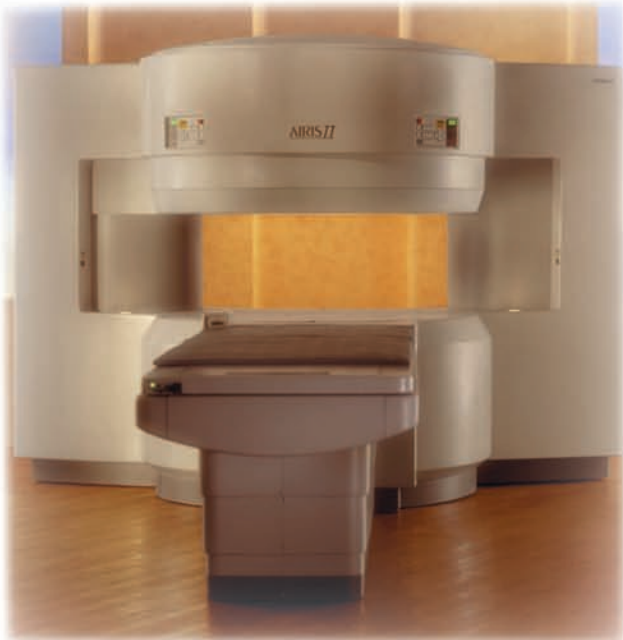
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The single strongest predictor of weight gain from pre-to 1-year post-pregnancy is the magnitude of weight gained during pregnancy. The National Academy of Science **Institute of Medicine (IOM)** has formulated recommendations for healthy weight gain during pregnancy. However, in a recent study of 500 pregnancies in Rhode Island, we found that more than one-third of normal weight women and two thirds of overweight women exceeded these recommended levels; similar findings have been observed elsewhere.<sup>9,10</sup>

Women with excessive weight gains during pregnancy are at increased risk of retaining significant degrees of weight postpartum.<sup>11</sup> Moreover, weight gains that exceed the recommended levels have been connected to hypertension, diabetes, pre-eclampsia, cesarean sections, and babies that are large for gestational age. Helping women gain the recommended amount during pregnancy through healthy eating, physical activity, and self-monitoring, could prevent excessive weight retention and its associated complications. The years preceding and/or following pregnancy may provide other opportunities (“teachable moments”) for practitioners to help women achieve and maintain a healthy body weight. Breastfeeding for one-year post-partum may slightly reduce one-year weight retention, but has other benefits for maternal and infant health. Our clinic is seeking to determine whether the incidence of pregnancy-associated weight retention and obesity can be reduced through behavioral lifestyle interventions that target the pre-pregnancy, pregnancy, and/or the postpartum periods.

*Menopause* Another high-risk time for weight gain in women is the period surrounding menopause. In a longitudinal study of 541 healthy premenopausal women, aged 42 – 50 at study entry, the average weight gain was 5 pounds over 3 years and 12 pounds over 8 years. This gain was associated primarily with aging, rather than with the hormonal changes of menopause *per se*. Moreover, decreased physical activity was the most consistent behavioral

factor associated with this gain.

The menopausal transition is associated with a worsening in cholesterol levels, an effect which is particularly pronounced in women who gain weight at this time. Therefore, lifestyle intervention aimed at modifying dietary and physical activity behaviors might help prevent both the weight gain and the worsening in cardiovascular risk factors. The Women’s Healthy Lifestyle Project<sup>12</sup> was a 5-year randomized clinical trial testing the hypothesis that lifestyle intervention could reduce the magnitude of weight gain and the increase in LDL-cholesterol seen in women during the time of the menopause. The 535 participants were aged 44 – 50, had a BMI of 20 – 34, fasting cholesterol of 140 – 260 mg/dl and a fasting LDL-C of 80 – 160 mg/dl. These women were randomly assigned to lifestyle intervention or an assessment only control group.

All women, including those who were normal weight, were encouraged to lose weight initially to offset the anticipated weight gain. Women who were normal weight (BMI  $\leq$  24 mg/dl) were encouraged to lose 5 lbs; those with a BMI of 25 – 26 were encouraged to lose 10 lbs; those with a BMI of 27 – 34 were encouraged to lose 15 lbs. Women consumed a low calorie/low fat diet and increased physical activity to a goal of 1000 – 1500 kcal/week. Intervention activities included 6 months of group meetings followed by periodic individual and group sessions throughout the 4 years. Follow-up assessments were held at 6, 18, 30, 42, and 54 months.

The intervention was effective in blunting the anticipated gain; the intervention group lost 10.8 lb during the first 6 months. Although these women gradually regained weight over the course of the trial, they maintained a weight loss of -0.2 lb at 54 months. This contrasted with a 5.2 lb weight gain in the control group. At the end of the study, 55% of the intervention participants were at or below their baseline weight, compared with 26% of controls ( $p < .001$ ). Weight loss was strongly associated with adherence to

both physical activity and the dietary prescriptions.

The intervention also produced significant effects on lipids, blood pressure, insulin, and glucose. At month 54, LDL cholesterol in the intervention group had increased by 3.5 mg/dl, whereas the control group had increased by 8.9 mg/dl ( $p .009$ ). Waist circumference decreased 2.9 cm in the intervention group compared with .5 cm in the control. Thus, intervention at this time period may have multiple benefits for women.

*Urinary incontinence* Urinary incontinence may be alleviated by weight loss. An estimated 13+ million women in the US have urinary incontinence; including approximately 25% of reproductive age women and 50% of postmenopausal women. Epidemiological studies show that obesity is a strong risk factor for incontinence; each 5-unit increase in BMI leads to 60% increase in risk of daily incontinence. Among older women with incontinence, 65 – 75% are overweight.

Several studies have suggested that weight loss may improve incontinence. Subak et. al<sup>13</sup> reported results of a small randomized trial with 42 overweight or obese incontinent women: 22 were randomized to an immediate weight loss condition, 20 to a delayed treatment control. The weight loss intervention included a very low calorie diet, exercise, and behavior modification. The intervention-group women lost 14 kg compared to a 0 kg in the control group. This weight loss resulted in a 60% reduction in weekly incontinence episodes compared to a 15% reduction in the control group. In the intervention group, 16% of women had 100% improvement in incontinence, 37% were at least 75% improved, and 58% were at least 50% improved. Stress and urge incontinence both decreased in the treatment group vs. the wait-list.

The **NIH (NIDDK)** recently funded a multi-center clinical trial, **PRIDE (Program to Reduce Incontinence through Diet and Exercise)**, testing the effectiveness of weight loss for women with urinary

**Table 3.**

**NIH-funded Studies Currently Recruiting at the Weight Control and Diabetes Research Center (401-793-8940)**

<b>PRIDE:</b> Program to Reduce Urinary Incontinence by Diet and Exercise. This study provides an 18-month weight loss program for overweight women aged $\geq 30$ years with $\geq 10$ incontinent episodes/week.
<b>LEAP:</b> Lifestyle, Eating and Activity Program. This 18-month program is recruiting pairs of overweight individuals who live together (e.g., spouses) to examine the effects of modifying the home environment.
<b>LITE:</b> Living Lean in a _____ Individuals who are normal weight or have successfully reduced from obese to normal weight are provided information about their current eating and exercise habits.

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Weight Control  
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(Table 3)

**CONCERNS ABOUT WEIGHT LOSS IN WOMEN**

In the past,  
for limited effectiveness  
adverse emotional  
precipitating binge  
recent studies and  
National Task Force  
and Treatment have  
to rest. The review  
dieting in overweight  
women is not associated  
psychosocial or behavioral  
the contrary, dieting  
associated with numerous  
and physical benefits.  
weight loss regimens  
low calorie diets  
to increase binge

Dietary-induced  
may result in a  
overweight women.  
study, women  
intervention who  
months experienced  
in rate of hip bone  
**(BMD)** loss compared to the control  
group, which gained 1.5 kg.<sup>14</sup> A  
similar pattern was seen for BMD  
change at the spine, although the  
difference was non-significant. Large  
increases in physical activity helped  
reduce the amount of spine BMD loss,  
but not hip loss. Since osteoporosis  
is an important health concern for  
women, further research is needed to

the effect of weight  
be attenuated by  
resistance training.

affects the health of  
women nationwide.  
loss typically involves  
consuming a low  
diet, engaging in high  
activity, and frequent  
Promoting such  
during critical life  
women, such as during  
menopause, may be  
eating and preventing  
diseases in women.

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