

Obesity and Sedentary Lifestyles

Risk for Cardiovascular Disease in Women

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It is well known that obesity and sedentary behavior coexist and that both are associated with cardiovascular disease (CVD) in women. Data from the Centers for Disease Control (CDC) show that in areas of the United States where rates of obesity are higher than 30% (Fig. 1), the prevalence of adults who report no leisure-time physical activity is also higher than 30% (Fig. 2). Likewise, the prevalence of obesity and physical inactivity predicts the presence of CVD death (Fig. 3). To highlight the association between the 3 conditions, one can nearly superimpose these 3 maps from the CDC.

More recently, however, questions have been raised about whether obesity and physical activity are independently associated with CVD risk or if they simply are associated with risk through known risk factors: diabetes mellitus, hypertension, and hypercholesterolemia. If the latter is true, risk reduction with pharmaceutical interventions—in spite of cost, side effects, and incomplete efficacy—might spare providers the difficult task of encouraging weight loss and promoting increases in physical activity. If the former is true, however, weight loss and physical activity are crucial therapies for the prevention of CVD in women.

★ CME Credit

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Obesity and Cardiovascular Disease Risk

There is abundant evidence that obesity increases the risk of elevated blood sugar, hypertension, and hypercholesterolemia. Similarly, there is ample evidence that weight loss mitigates those risk factors. Several recent studies, however, have explored the question of whether obesity increases the risk of CVD in the absence of other comorbid conditions. Most of the evidence supports obesity as an independent risk factor for CVD in men and women (Table I).¹⁻⁴ Even in the absence of metabolic abnormalities or comorbid conditions, individuals who are obese have higher rates of cardiovascular events over their lifetimes. One study suggests that the mechanism for this increased risk may be related to the presence, in obese individuals, of elevated inflammatory markers that are associated with CVD.³

Data that did not fully support obesity as an independent CVD risk factor came from a large study of men and women for whom obesity's effect on CVD seemed to be associated solely with its effect on other metabolic abnormalities.⁵ Although this well-done analysis might call into question obesity's role in CVD, its follow-up duration (8–10 yr) was shorter than the follow-up of similar studies. Consequently, the results might simply indicate that the cardiovascular effects of obesity are incurred not in the short run, but over decades.

Physical Activity and Cardiovascular Disease Risk

Like the question of obesity, it is important to understand whether physical activity directly reduces CVD risk or if it does so only by lessening other risk factors. Four studies published in 2011 provide evidence that physical activity not only reduces long-known CVD risk factors but reduces CVD risk on its own (Table I).⁶⁻⁹ One study even suggests that the risk reducing benefits of exercise might be more pronounced in women than in men.⁷ It is of interest that as little as 75 minutes a week of light physical activity could reduce cardiovascular risk by as much as 14%.

Evidence-Based Interventions and Clinical Implications

The evidence described here supports the importance of weight reduction and physical activity in the prevention of CVD in women and men alike. Physicians can and

TABLE I. Summary of Studies Included in Review

Study	Description	Sample	Women	Follow-Up	Question	Key Findings
Obesity						
Arnlov J, et al. ¹ (2010)	Prospective study in Swedish men without diabetes mellitus	1,758	0	30 yr	How do BMI and metabolic syndrome affect risk of CVD?	Metabolic syndrome and excess weight independently increase risk of CVD.
Flint AJ, et al. ² (2010)	Prospective study (Health professionals' Follow-up Study and Nurses' Health Study)	119,054	64%	16 yr	How do BMI and the presence of comorbid conditions affect the risk of developing CVD?	Excess weight with and without comorbid conditions increases risk of CVD.
Wildman RP, et al. ³ (2011)	Cross-sectional study of postmenopausal women	1,889	100%	N/A	How do BMI and metabolic phenotype affect the presence of inflammatory markers associated with increased risk of CVD?	Obesity, metabolic syndrome, and diabetes increase risk of inflammatory markers.
Logue J, et al. ⁴ (2011)	Subanalysis of RCT of Scottish men with hypercholesterolemia	6,082	0	15 yr	How does BMI influence the risk of fatal and nonfatal CHD?	Elevated BMI increases risk of fatal but not nonfatal CHD events.
Wildman RP, et al. ⁵ (2011)	Pooled data from Framingham Offspring, Atherosclerosis Risk in Communities, and Cardiovascular Health Studies	20,298 ≥ age 45 yr	55%	8–10 yr	Is abdominal obesity a risk factor for CVD in the absence of metabolic abnormalities?	Abdominal obesity did not add risk in individuals with normal metabolism, metabolic syndrome, or diabetes. Abdominal obesity did add risk in individuals with 1 to 2 metabolic abnormalities.
Physical Activity						
Luke A, et al. ⁶ (2011)	Cross-sectional study of NHANES, 2003–2006	3,370 age 20–65 yr	48%	N/A	What is the relationship between physical activity (objectively measured) and CVD risk factors?	Minutes of moderate and vigorous physical activity as measured by accelerometers were associated with improved systolic blood pressure, blood glucose, BMI, and HDL-C.
Sattelmair J, et al. ⁷ (2011)	Meta-analysis of 33 prospective cohort studies	33 studies	18 of 33 studies included women	2–25 yr	What is the relationship between the amount of physical activity done and the CVD risk?	Individuals achieving 75 to 150 min/wk of physical activity had a 14% risk reduction; 300 min/wk of physical activity had a 20% risk reduction; some evidence that risk reduction was greater among women than in men.
Reddigan JI, et al. ⁸ (2011)	Third NHANES, 1988–1994	10,261	52%	13.4 yr	Does physical activity provide protective effects against CVD death in individuals with and without metabolic risk factors?	Light, moderate, and vigorous physical activity is associated with approximately 30% decreased risk of CVD death, regardless of metabolic or inflammatory profile.
Chiuve SE, et al. ⁹ (2011)	Prospective study, Nurses' Health Study	81,722	100%	26 yr	Does adherence to a healthful lifestyle (not a smoker, BMI <25, physically active 30 min/d, consumption of Mediterranean-type diet) lower risk of sudden cardiac death?	Each of the 4 low-risk lifestyle factors significantly and independently was associated with lower risk of sudden cardiac death.

BMI = body mass index; CHD = coronary heart disease; CVD = cardiovascular disease; HDL-C = high-density-lipoprotein cholesterol; N/A = not available; NHANES = National Health and Nutrition Examination Surveys; RCT = randomized controlled trial

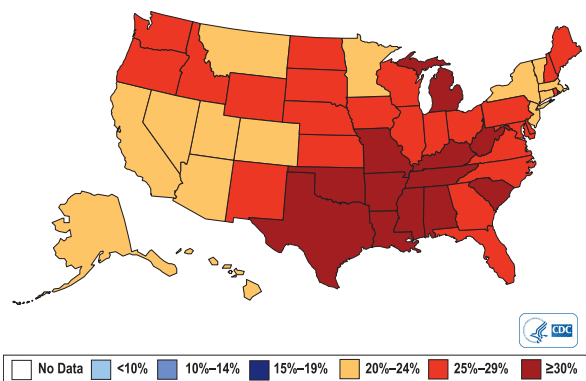


Fig. 1 Obesity trends* among U.S. adults. Behavioral Risk Factor Surveillance System, 2010.

*Body mass index ≥ 30 or ~ 30 lbs. overweight for 5'4" person

Available from: <http://www.cdc.gov/obesity/data>

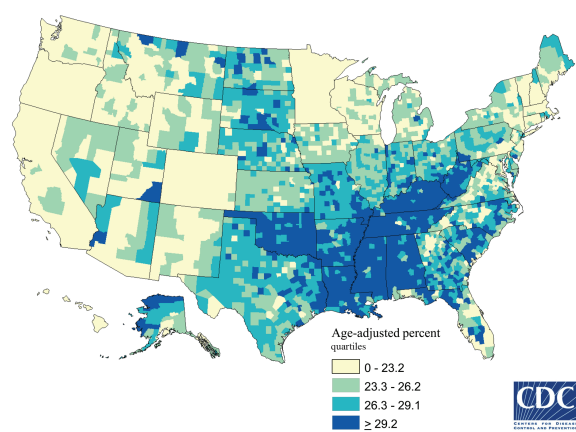


Fig. 2 County-level estimates of leisure-time physical inactivity among adults aged ≥ 20 years: United States, 2008.

Available from: <http://www.cdc.gov/obesity/data>

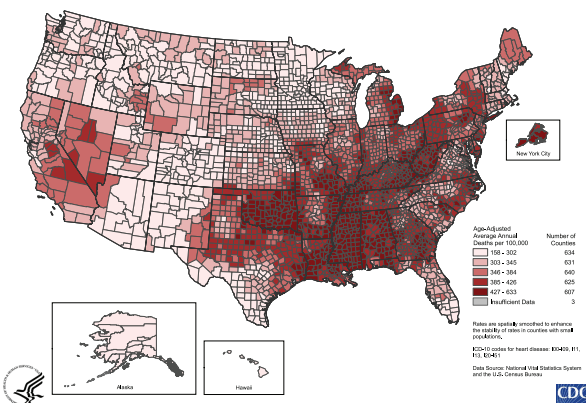


Fig. 3 United States: heart disease death rates. Women, aged 35+, 2000–2006.

Available from: http://www.cdc.gov/dhdsp/maps/national_maps/hd_women.htm

should assist patients in this effort by using evidence-based programs. Two large randomized-control trials provide guidance on strategies and programs that work. The first study is the Diabetes Prevention Program (DPP). Individuals who were determined by laboratory testing to be at risk for diabetes were randomized to receive metformin or an intensive lifestyle intervention that promoted calorie control and 150 min/wk of physical activity. Fifty percent of the intensive lifestyle-intervention group lost 7% of their body weight and reduced their risk of developing diabetes over 3 years by nearly 60%, which surpassed the findings in the metformin group.¹⁰ The 2nd study compared the effects on CVD risk factors of an intensive lifestyle-intervention program (similar to that of DPP) in diabetic patients to the effects of routine diabetes support and education in a control group. The lifestyle-intervention group, in comparison with the control group, had greater weight loss and significantly greater improvement in blood sugar, blood pressure, and lipids.¹¹ Evidently, these programs accomplished CVD risk reduction not only by preventing or reducing known risk factors, but by reducing weight and increasing activity levels.

Use of these evidence-based programs has become easier for practitioners in two ways: 1) DPP educational materials are free and easy to obtain online, and 2) there are newly implemented community-based DPP programs for at-risk individuals. The DPP program materials can be downloaded at http://www.bsc.gwu.edu/dpp/lifestyle/dpp_part.html and are available in English and Spanish. Moreover, YMCA centers around the country are offering the DPP in the community. Participating centers can be found at <http://www.ymca.net/diabetes-prevention>.

Conclusions

Weight loss and physical activity independently reduce CVD risk in women and are important tools for prevention and risk reduction for CVD in women. Clinicians can assist patients with lifestyle changes by using the tenets and materials of the Diabetes Prevention Program in their offices or by referring patients to community-based programs at area YMCAs.

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