

# The Health Risks of Obesity Have Not Been Exaggerated

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There is public health concern regarding the prevalence of overweight (body mass index [BMI]  $\geq 25$  kg·m<sup>-2</sup>) and obesity (BMI  $\geq 30$  kg·m<sup>-2</sup>) in the United States and other countries throughout the world. The prevalence of obesity in the United States is 35.0% for men and 40.4% based on 2013 to 2014 national survey data (1), with the overall prevalence of obesity increasing in adults from 30.5% in 1999 to 2000 to 37.7% in 2013 to 2014 (2). Of additional concern is the prevalence of class 3 obesity (BMI  $\geq 40$  kg·m<sup>-2</sup>), with data from 2013 to 2014 in the United States demonstrating a prevalence of 5.5% for men and 9.9% for women. Since 2005, there has been a trend for an increase in the prevalence of both obesity and class 3 obesity, which significantly increased for women, but not for men (1). These trends and prevalence rates of obesity are of concern because of the demonstrated association between obesity and many negative health consequences.

## ALL-CAUSE MORTALITY AND CHRONIC DISEASE

Body mass index is associated with all-cause and cardiovascular disease mortality in men (3), and this association has also been reported for women (4). Although there may be an attenuation in the relationship between BMI and mortality with age, it appears that this relationship remains significant across middle to older age (5). Body mass index is also associated with mortality from numerous forms of cancer (6) and with the incidence of type 2 diabetes (7).

Excess body weight is also associated with increased incidence of cardiovascular disease. Data compiled from 10 prospective cohorts demonstrated that the lifetime risk for incident cardiovascular disease was increased in adult men and women with overweight or obesity compared with those

who were normal weight (8). This study also showed that adults classified with overweight or obesity had a greater number of years lived with cardiovascular disease compared with adults classified as normal weight (8).

An area of importance is whether obesity is associated with negative health outcomes in patients with existing chronic diseases. For example, evidence from a registry of patients with stable coronary artery disease indicated that patients with obesity had a greater mortality risk (hazard ratio, 1.12; 95% confidence interval, 1.02–1.23;  $P < 0.02$ ) compared with normal weight patients across a 20-yr follow-up period (9). In a prospective international, multicenter study of patients with known coronary artery disease, a higher BMI was shown to be associated with all-cause mortality and increased risk of myocardial infarction (10). In patients with cancer, there is also evidence that higher BMI is associated with greater likelihood of recurrence or poorer survival (11,12).

Weight loss of significant magnitude in patients who are overweight or obese can reduce the incidence of chronic disease, such as cardiovascular disease. The Action for Health in Diabetes (Look AHEAD) Study examined the influence of an intensive lifestyle intervention that included targeting both weight loss and increased cardiorespiratory fitness in patients with type 2 diabetes. Although the primary analysis showed no significant influence of the intensive lifestyle intervention on incidence of cardiovascular disease compared with a diabetes support and education condition across a median of 9.6 yr of follow-up (13), there was evidence of a significant influence of weight loss on incidence of cardiovascular disease. Patients in the intensive lifestyle intervention who reduced body weight by at least 10% after 1 yr of treatment had a 20% reduction in cardiovascular disease incidence compared with the diabetes support and education condition (14).

There is also evidence that weight loss can reduce the risk of other chronic conditions. For example, weight loss reduces the risk of developing type 2 diabetes (7,15). One of the key lifestyle interventions that has shown the effectiveness of weight loss on reduction in development of type 2 diabetes is the Diabetes Prevention Program. The weight loss program implemented in this program resulted in lower incidence of type 2 diabetes compared with metformin or placebo (4.8, 7.8, 11.0 cases per 100 person-years, respectively) across an average of 2.8 yr of follow-up.

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In patients with type 2 diabetes, weight loss also results in partial or full remission of type 2 diabetes. Weight loss may also reduce the need for medication in patients with type 2 diabetes. For example, in the Look AHEAD study, the weight loss intervention resulted in a lower use of antihypertension medications, statins, and insulin compared with the control condition (13). Of interest is that despite this lower medication use, the weight loss intervention also resulted in greater reductions in glycated hemoglobin and systolic blood pressure, and greater improvements in high-density lipoprotein cholesterol compared with the control condition.

## OTHER HEALTH-RELATED OUTCOMES

There are other health-related factors associated with overweight and obesity that warrant consideration. For example, low-back pain has a negative financial impact resulting from medical treatment, pain management, and loss of productivity. Data from the National Health Interview Survey indicates that adults who are overweight or obese report greater low-back pain compared to normal weight adults (16). Results from a meta-analysis also indicate that obesity is associated with chronic pain of the legs, feet, and back (17).

Obesity is also negatively associated with health-related quality of life (18), and weight loss may result in improvements in physical components of health-related quality of life (19). Obesity is associated with greater limitations in physical function in middle-age adults (20), and in older adults obesity is associated with poorer balance and mobility (21). The intensive lifestyle intervention within the Look AHEAD Study, which focused primarily on inducing weight loss, has been shown to enhance disability-free life expectancy, reduce knee pain, and enhance mobility. This poorer physical performance may be due to the negative influence of obesity on joints of the body, such as greater peak knee compressive and shear forces in patients with knee osteoarthritis (22). Obesity is also associated with higher prevalence of depression (23), greater levels of body dissatisfaction (24), and sleep disorders (25).

## CONCLUDING STATEMENT

There is public health concern regarding the prevalence of excess body weight that results in overweight or obesity. While health concerns are related to mortality, cardiometabolic conditions, diabetes, and cancer, there are other health-related conditions that are also associated with obesity. These include increased pain, reduced physical function, disordered sleep, reduced health-related quality of life, and increased psychosocial conditions, such as depression and body dissatisfaction. Thus, it may be best to consider obesity as an intermediate biomarker that indicates the potential risk for downstream negative health consequences, and for health care providers to consider obesity in a similar manner to how other health risk factors are considered (e.g., hyperlipidemia, hypertension, etc.). Moreover, although not all patients with obesity will

experience all of the associated negative health effects, leaving obesity untreated is not the appropriate clinical course of action.

Therefore, of clinical importance is how to address the health-related concerns associated with obesity. There is evidence that weight loss can reduce the health-risk of obesity, and weight loss can be induced through lifestyle approaches (diet and physical activity) or medical approaches (pharmacotherapy or bariatric surgery). It is also important to recognize that lifestyle changes (diet and/or physical activity) may result in reduced health risk and improved health benefits even in the absence of weight loss. Thus, to optimize health, the clinical focus should be on: 1) prevention of excessive weight gain, 2) weight loss for patients who are already obese, 3) engagement in lifestyle behaviors that include diet and physical activity to enhance weight management and that may have effects on health, independent of body weight status.

## RESPONSE TO GAESSER AND BLAIR

Gaesser and Blair (26) provide important perspectives when addressing the health implications of obesity. Their perspective starts with the premise that “despite intense focus on obesity as a public health crisis, weight control efforts have been largely ineffective.” We would disagree with this perspective because there is ample evidence that suggest that lifestyle interventions are efficacious for reducing body weight and treating obesity. Current clinical guidelines recommend a comprehensive lifestyle intervention that includes the combination of diet, physical activity, and behavior therapy, with this type of comprehensive treatment resulting in weight loss of 5% to 10% of initial body weight (27), and this has been endorsed more recently by other medical societies (28). Additionally, we provide the perspective that the challenge is optimal engagement and sustainability of lifestyle behaviors, such as physical activity, that contribute to body weight regulation (29–34).

The challenge of sustainability of weight loss mirrors the same challenges reported in the literature for sustaining physical activity and the corresponding improvements in cardiorespiratory fitness, which Gaesser and Blair suggest should be the focus of public health initiatives. For example, Dunn et al. (35) studied two physical activity interventions (structured vs. lifestyle) in 235 healthy sedentary adults across a 24-month intervention period. Although both interventions demonstrated significant increases in physical activity during the initial 6 months, both interventions also demonstrated significant decreases in physical activity from 6 to 24 months which corresponded to a decrease of approximately 50% of the initial gains observed at 6 months. Similarly, although cardiorespiratory fitness increased initially at 6 months in both the lifestyle and structured interventions, there was a decrease in cardiorespiratory fitness from 6 to 24 months of 44% and 66% in response to these physical activity interventions, respectively. Thus, although

we agree that emphasis on physical activity is important for adults who are overweight or obese, challenges exist to both the adoption and maintenance of physical activity and cardiorespiratory fitness that mirror the challenges observed for long-term weight loss.

Additionally, Gaesser and Blair suggest that “a moderate-to-high level of cardiorespiratory fitness attenuates, or eliminates, mortality risk associated with high body mass index.” We agree with this perspective, but with some reservation. As demonstrated above, maintaining a moderate-to-high level of cardiorespiratory fitness in previously sedentary adults is challenging, which may minimize the public health benefits of solely focusing on cardiorespiratory fitness. Moreover, in studies demonstrating that a moderate-to-high level of cardiorespiratory fitness attenuates, or eliminates, mortality risk associated with high BMI, few of these studies have reported adults with severe obesity (BMI  $\geq 35$  kg·m<sup>-2</sup>) are classified as having moderate-to-high levels of cardiorespiratory fitness (36–39). Thus, there may be challenges to sustaining moderate-to-high levels of cardiorespiratory fitness in adults with obesity, which may impact emphasizing this as the primary focus of public health and clinic-based approaches to improve health and reduce premature mortality.

Key to the perspective of Gaesser and Blair is the importance of cardiorespiratory fitness on health and mortality, yet they state that “treatment, if warranted, be non-weight-loss centered, with a focus on improving healthy behaviors.” We agree that the cornerstone of optimal health, regardless of BMI or weight status, is sustained engagement in healthy lifestyle behaviors (e.g., optimal nutrition, sufficient physical activity, low sedentary behavior, absence from smoking, compliance with prescription medication, etc.). However, cardiorespiratory fitness, similar to weight, is an outcome related to health and not a behavior *per se*. Therefore, using the position of Gaesser and Blair relative to weight, the focus should not be on cardiorespiratory fitness, but rather on engagement in physical activity and lack of sedentary behavior.

The perspective that “a metabolically healthy obese phenotype diminishes risk associated with high BMI” should also be interpreted with caution. Recent perspectives have suggested that although there is evidence of a metabolically obese phenotype, this may be a transient state that appears to worsen over time (28). Moreover, Kramer et al. (40) concluded that there are long-term adverse conditions associated with obesity, even in the absence of cardiometabolic

abnormalities, to suggest that obesity is likely to result in negative health outcomes at some point across the lifespan.

Gaesser and Blair also focus primarily on mortality and cardiometabolic health. We understand the potential rationale for the focus on these outcomes; however, this may be a limited perspective of the health consequences of obesity and the potential benefits of weight loss. For example, in an 18-month study of 316 adults  $\geq 60$  yr of age with knee osteoarthritis, weight loss compared with baseline weight was 5.7%, 4.9%, and 3.7% with a diet plus exercise intervention, diet intervention, and exercise intervention, respectively (41). The primary outcome, physical function, improved significantly in both the diet plus exercise intervention and diet intervention, with the change in physical function not being statistically significant in the exercise only intervention. Obstructive sleep apnea (OSA) also increases in prevalence at higher levels of BMI (42), and weight loss has also been shown to be associated with a reduction in OSA (43). However, change in cardiorespiratory fitness does not appear to influence OSA severity when weight loss is taken into account (44). Obesity also has implications on low-back pain (16), chronic pain (17), health-related quality of life (18), physical function (20), balance and mobility (21), depression (23), body dissatisfaction (24), along with other chronic conditions, such as cancer (6) and type 2 diabetes (7). Thus, in adults with obesity, these are important considerations that may impact focusing primarily on physical activity as suggested by Gaesser and Blair.

## CONCLUDING STATEMENT

We agree with the perspective of Gaesser and Blair that an emphasis to optimize health should be placed on sustained engagement in lifestyle behaviors, which includes physical activity, in adults with obesity. However, we disagree that the emphasis should ignore obesity as an outcome and focus primarily on cardiorespiratory fitness. Rather, we suggest that to optimize health, the public health and clinical focus should be on lifestyle behaviors that influence both weight status and cardiorespiratory fitness.

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