Physical activity and diet manipulation impact on oxidative stress caused by obesity

This article reviews the impact of physical activity and diet manipulations on obesity-related oxidative stress. Oxidative stress caused by obesity has found to be associated with metabolic and cardiovascular disease, including endothelial dysfunction and atherosclerosis. Reactive oxygen species (ROS) are known to be essential for several physiological functions such as modulating endothelial function, gene expression, infection defense, and cellular growth. However, oxidative stress caused by elevated ROS and/or diminished antioxidant capacity could cause dysfunction. In addition, aerobic exercise, often utilized to reduce obesity, has been shown to result in an acute state of oxidative stress. Nevertheless, prolonged physical activity could provide a stimulus for favorable oxidative adaptations and enhanced physiological performance and physical health. However, an understanding of the distinct mechanisms explaining the benefits is yet lacking.

Further, obesity has shown to elevate the risk of oxidative stress, while weight loss has shown to play a significant role in the alleviation of oxidative stress. In terms of diet, chronic ingestion of energy-rich foods may contribute to obesity, while acute ingestion may elicit potentially adverse metabolic responses including oxidative stress. Also, caloric restriction may attenuate oxidative stress and serve as a beneficial weight loss intervention for obese individuals.

In conclusion, the review states that appropriate lifestyle modifications, such dietary modification and exercise interventions, have beneficial effects in alleviating oxidative stress susceptibility.


Bariatric surgery association with depression and suicide

Bariatric surgery has been found to be linked to increased self-harm and suicide attempts. To substantiate this linkage, a study conducted by researchers of Sunnybrook Research Institute, Toronto, tracked 8,815 patients in Canada who had undergone bariatric surgery for a period of 3 years post-surgery. This study found that 1.35% of these patients were subsequently hospitalized due to self-harm incidents, many of which were emergencies.

Several findings of this study explained the linkage between self-harm and bariatric surgery. Firstly, it is known that obese individuals have a higher likelihood of experiencing depression than average weight individuals; therefore, they are already in the at-risk category for inflicting self-harm, including by substance abuse and eating disorders. After bariatric surgery, this likeliness greatly increases because of the realization that obesity was the least of their problems.

The authors also found that low-income and rural area individuals had a higher probability of self-harm and suicide as compared to others. Surprisingly, the study also found that such self-harm occurrences are more likely to occur in affluent countries such as the USA. The lead author of this study believes that the increased physiological and social stress in patients after surgery contributes to the increase in suicide attempts.

However, critically, Dr. John M. Morton of the American Society for Metabolic and Bariatric Surgery states that pre-existing psychological issues do not go away after surgery, which is not what a patient anticipates, thereby increasing depression.

Bariatric surgery is well-known as the best alternative to help achieve the target weight loss necessary to overcome the morbid obesity issue. Bariatric surgery has also been the only weight loss
approach that successfully resolves type 2 diabetes. With ever-increasing obesity rates, and acknowledging increase in depression, Dr. William S. Richardson of New Orleans states that the study overlooks certain facts and recommends making mental health counseling a necessity for post-surgical bariatric patients.


Halting hormone therapy in postmenopausal women after myocardial infarction

A recent study demonstrates that although hormone therapy might have protective effect in postmenopausal women during a first myocardial infarction (MI), it could increase the risk and severity of a second MI.

The study analyzed 7258 women who experienced their first MI from 1995 to 2009 and who were entered in FINAMI, a population-based register of acute coronary events in Finland. Of these, 625 women were using hormone therapy, whereas 6633 were not.

The authors, in an age-adjusted analysis, found that during the first MI, women on hormone therapy were less likely than those not on hormone therapy to die before reaching the hospital (22% vs. 25.8%) and also had a lower fatality rate in the month after MI (18.5% vs. 24.7%) and in the year after MI (42.5% vs. 51.7%).

Furthermore, age of hormone therapy had little effect on MI fatality risk but hormone therapy duration had an effect on the fatality rate in the 28 days after the MI: women on hormone therapy <5 years had a fatality rate of 38.5% (OR: 0.83), women on hormone therapy had a fatality rate of 29.8% (OR: 0.54), and those that never had hormone therapy had a fatality rate of 43.4% (P<0.001).

However, surprisingly, there is an association between fatality and the use of hormone therapy after the first MI (OR: 1.6), with a threefold risk of the second MI being fatal. The possible explanation, according to Tomi Mikkola, Helsinki University, would be that the after the first MI, women likely have other unstable plaques that are prone to rupture, and estrogen is known to destabilize plaques. This finding is in contrast to the belief that hormone therapy protects women from coronary heart disease.

Therefore, hormone therapy use is recommended to be halted after the first MI.


WHO global recommendations on physical activity for health

WHO has developed the "Global Recommendations on Physical Activity for Health" with aim of providing national and regional level policy-makers with guidance on the dose–response relationship between the frequency, duration, intensity, type, and total amount of physical activity needed for the prevention of NCDs.

For the 5–17 years old age group, it is recommended that they should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily (>60 minutes would provide additional health benefits). Also, most of the daily physical activity should be aerobic. Vigorous-intensity activities should be incorporated at least 3 times per week.

For the 18–64 years old age group, it is recommended that they should do at least 150 or 75 minutes of moderate- or vigorous-intensity aerobic physical activity throughout the week, respectively, or an equivalent combination of the two. Aerobic activity should be performed in bouts of at least 10 minutes duration. Further, it is recommended that muscle-strengthening activities should be done involving major muscle groups on 2 or more days a week.

For the 65 years old and above age group, all recommendation of the 18–64 years old age group apply. Further, those with poor mobility should perform physical activity to enhance balance on 3 or more days per week. Also, if they cannot do the recommended physical activity due to health conditions, they should be as physically active as their abilities and conditions allow.
**Causes of the obesity epidemic in children and adults**

Obesity prevention has attained a high priority wherein intervention strategies have mainly been based on healthy eating and physical activity, both in children and adults. However, to date, there has been no systematic compilation of published scientific data to determine whether there is clear consensus on the causes of obesity.

To fill this gap, this review conducted a systematic review of the literature by searching PubMed/Medline for narrative and systematic review articles published between January 1990 and October 2014 that examined the causes of obesity. Overall, 12 of 65 articles met the inclusion criteria; 7 reviews focused on adults (1 systematic and 6 narrative articles) and 5 reviews on children (2 systematic and 3 narrative articles). The authors found “combined physical activity and diet” to be the most popular cause of obesity identified in reviews of adult studies (3 of the 7 studies), whereas “inconclusive” was found to be the most popular cause specified in reviews of child studies (2 of the 5 studies).

The authors conclude that although several reviews have examined the obesity causes, the methodology and conclusions have varied widely, and few have been conducted systematically. Thus, the authors did find a consensus across published literature reviews regarding the primary cause of the obesity epidemic.


**Aerobic training, resistance training, or both and psychological health in obese adolescents**

This study was conducted to determine the effects of aerobic training, resistance training, or both on the mood, body image, and self-esteem in obese adolescents.

After a 4-week pre-randomization treatment, the authors randomized the 304 post-pubertal adolescents (91 males and 213 females) aged 14–18 years into 1 of the following 4 groups for 22 weeks: aerobic training \( (n = 75) \), resistance training \( (n = 78) \), combined aerobic and resistance training \( (n = 75) \), or non-exercising control \( (n = 76) \). The authors provided all participants with dietary counseling, with a daily energy deficit of 250 kcal. For assessment, the authors used the Brunel Mood Scale and Multiple Body Self-Relations Questionnaire for measuring mood and body image, respectively, while physical self-perceptions and global self-esteem were measured using the Harter Physical Self-Perceptions Questionnaire.

The authors found the median adherence to be 62%, 56%, and 64% in aerobic, resistance, and combined training, respectively. Resistance and combined training was found to produce greater improvements than control on vigor, and resistance training was shown to reduce depressive symptoms. All groups improved on body image and physical self-perceptions, but combined showed greater increases than control on perceived physical conditioning, while only resistance training showed greater increases than controls on global self-esteem. Both combined and resistance training demonstrated greater increases in perceived strength than control. Psychological benefits were more related to better adherence and reductions in body fat than changes in strength or fitness.

Conclusively, the authors state that resistance training, alone or in combination with aerobic training, may provide psychological benefits in adolescents with overweight or obesity, and therefore could be an alternative to aerobic training for some individuals in the biological and psychological management of adolescent obesity.

*Source: Goldfield GS and others. J Consult Clin Psychol. 2015 [Epub ahead of print]*