

Short Communication

Effectiveness of Dieting and Exercise on Weight Loss and Weight Maintenance: A Short Comparative Review

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Abstract

Over the past years particularly the last decade, the need for losing weight and staying “fit and healthy” has increased progressively. However, inasmuch as it has become seemingly vital to lose excess body weight and maintain it within average ranges, the reasons for weight loss differ in individuals. As being overweight and obese is a risk factor for certain diseases, some individuals have resolved to losing excess weight and maintaining body weight within the average ranges in order to avoid being prone to such diseases. To others, the stigma that may come with being overweight has spurred them to seek and adopt ways and methods which would help to combat their status of being overweight. Whatever may be the reason for wanting to lose weight, people who seek to engage in activities which cause weight loss usually ask questions such as: “What method of weight loss is the best and how effective is it?” This paper seeks to provide information on the effectiveness of different practices of losing weight and which may be best for an individual as per the most common adopted methods—dieting and exercise.

Keywords: Obese; Body mass index; Exercise; Diet

Introduction

Generally, body weight is determined by a simple formula—the energy balance equation [1]. This energy balance system is determined by the amount of calories present within the body. The body stores energy in units expressed in calories in which a calorie is approximately equivalent to 4.2 kilojoules. Obesity and overweight can be diagnosed by employing different tools in conjunction, the commonest measurement being the Body Mass Index (BMI) which is obtained by dividing an individual’s weight to his/her squared height [2]. If the number of calories consumed exceeds the number burned by the body, body weight increases. If the number of calories consumed is less than the number burned, weight is lost and if the number of calories consumed is the same as the number burned by the body, weight is maintained. Since daily consumption of food provides the body with calories, being overweight is perceived, in most cases, as a condition which arises from eating much food and exercising very little or not at all. In this vein, it is generally believed that the most effective remedy for being obese is exercising more and eating less, this is however, not entirely correct. Hypotheses have revealed that the type and level of changes which occur biologically causing susceptibility to weight regain after initial weight loss may be different in diet-induced weight loss and that caused by exercise.

Discussion

Based on present global trends, by 2025, 18% of men and 21% of women will be obese and 6% of men and 9% of women will be severely obese [2]. The energy balance equation cannot be controlled voluntarily as the brain determines the amount of fat to be present within the body by possessing a complex mechanism which maintains energy intake and use in order to keep the body’s system within a ‘set point’ range for body fat [1]. During a meal, a satiety hormone, leptin, derived from fat cells is released into the bloodstream. A surge in leptin levels sends signals to the brain and brain seeks to maintain set point by interpreting the signals which then causes the individual to feel satisfied and more intake of food which may consequently lead to being overweight is terminated [1]. Different reviews have explained the compensatory modifications in biological systems which take part in energy utilization/storage and restricted diet induced appetite regulation [3]. These changes occur to regain lost weight so as to maintain set point. Diet-induced weight loss leads to a state of decreased resting and non-resting energy use, this energy restriction results in decreased leptin and increased cortisol levels [3], which all raise energy intake. Decrease in leptin levels causes increased activity in the feeding and satiety centers in the hypothalamus of the brain. This leads to increased appetite, especially for fatty foods with high calorie levels since the brain is trying to restore leptin levels back to normal. Over the years, retroactive and prospective clinical trials have shown significant early weight loss by consuming Very-Low-Calorie-Diets (VLCD), typically generating 400 kcal to 600 kcal per diet using total meal replacement [4]. However, weight loss by decreasing dietary calorie has been reported to either reduce mitochondrial respiration, induce mitochondrial biogenesis, or cause no changes in electron transport chain activity and mitochondrial content [5]. Mitochondrial respiration inhibitors cause an increase in triglyceride accumulation and decreased fatty acid oxidation [6] that produces energy-containing molecules such as NADH and FADH₂ which subsequently pass through the electron transport chain for generation of energy in the form of ATP. Furthermore, the expert obesity panel convoked by

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the National Heart, Lung and Blood institute some years ago did not encourage the use of VLCDs due to concerns arising from the fact that long-term weight losses, particularly after discontinuation in use of VLCD are not much different from those obtained with standard low-calorie diets [4]. This alludes that ongoing changes in calorie intake to attain energy balance in a weight-reduced condition continues to be a major problem in weight loss maintenance [4]. Physical exercise is a vital measure of lifestyle intervention for weight loss and although its adoption alone does not lead to a significant reduction in weight, it conserves Fat-Free Mass (FFM) during weight reduction which may result to a favorable outcome in body composition [7]. The body burns calories in three main ways: (i) during resting metabolism which deals with the amount of energy the body burns at rest just to keep one alive (ii) during food breakdown and (iii) during physical activity [1]. Physical activity, including exercise only accounts for 10% to 30% of energy use, the majority of calories the body burns every day comes from the basal resting metabolism [1,7]. A study revealed that if a 200 lb man (90.9 kg) ran for 60 minutes four times a week for 30 days, he would lose only about 5 lbs at most under normal conditions [1,3]. Weight loss induced by exercise is majorly made up of fat mass, with fat-free mass being conserved and resting metabolic rate being unchanged or slightly elevated while diet-induced weight loss is characterized by decreased resting metabolic rate, which may or may not be higher than predicted based on the loss of fat and fat-free mass [3]. Various previous reviews have proven that long-term weight loss is better achieved by combining both diet and exercise interventions [3,7]. After a year following the finish of a weight loss intervention by diet (800 kcal/day) or diet coupled with aerobic exercise (which involved running a treadmill thrice a week at 40 min/session by week eight) until both groups attained a BMI of 25 kg per meter squared, Hunter et al. re-examined the body weight in a group of initially obese women, the results obtained indicated that the subsequent increase in weight following weight loss was less in participants who adhered to aerobic exercise and more in those who did not adhere after the weight loss intervention [2,3].

However, a conclusion cannot be drawn from the result obtained above as gaining weight and becoming obese may be linked to other determining factors which may be social, hereditary, psychological, economic, amongst others. Outcomes of other reviews have indicated that long-term weight loss is better achieved by embarking on a diet compared with aerobic exercise with a piacere eating [3,4]. Results obtained by long-term trial in a study conducted by Racette, suggests that significant weight loss can be achieved clinically by exercise intervention alone only when energy loss caused by exercise is similar to that induced by diet restriction [3,5].

Conclusion

The response to a particular weight loss method differs in individuals as such it may be suggested that for individuals who are genetically prone to being obese and have had obese ancestors, the best remedy would be in adopting both the diet and exercise methods of intervention. Also, for individuals who are obese only as a result of excess body calorie levels with no genetic predispositions, restricting diet intake only may be the best solution since the brain works to regulate leptin levels within the set point. Set point in such individuals is not usually one which may cause obesity.

Author's Contribution

All authors participated in the search for literature, interpretation of the articles reviewed and have read and approved the final version of the manuscript.

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