

## Dietary, Lifestyle Behaviors and Obesity: towards Modern Science

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### Editorial

The epidemic of overweight and obesity presents a major challenge to chronic disease prevention and health across the life-span, as well as around the world. In United States, more than one-third of adults (35.0% among men and 40.4% among women) and 17% of youth are obese [1,2]. Although relatively stable between 2003-2004 and 2009-2010 [1,2], obesity's high prevalence in the US and the rapid increases worldwide, especially in childhood and other groups that experience health inequalities such as minorities or some occupational populations, represent major public health problems. Moreover, obesity strongly promotes risk factor clustering through adverse effects on blood pressure, lipids, glucose metabolism, sleep-disordered breathing and cardiac enlargement [3].

Although, obesity arises as the result of an energy imbalance between calories consumed and calories expended, recent evidence indicates that an energy-imbalance concept of obesity might be oversimplified. One study published in *JAMA* [4] showed that people consuming a low glycemic index diet expended more energy than those on a low-fat diet high-carbohydrate even when consuming the same number of calories. Thus, a new outlook on the science poses the question that a calorie may not always be just a calorie. The glycemic index of foods is key to measure different meals' ability to affect blood sugar levels. Thus, foods such as nuts, beans or non-starchy vegetables (low glycemic index) produce a different metabolic response in the body compared to refined grains, bread, or potatoes that spike blood sugar and stimulate hunger, glucose, insulin response, satiety, lipogenesis, metabolic response and even unfavorable microbiomes [5].

Weight loss recommendations should not be limited to the amount of total saturated fat but to limit refined grains and added sugars. When nutritional advice is given to people with increased adiposity, there is still an outdated reluctance to recommend healthy high-fat (such as extra-virgen olive oil, other monounsaturated fatty acids and polyunsaturated fatty

acids) diets as an alternative to obsolete and less palatable low-fat diets, in the mistaken belief that fat provides excess energy, thus promoting obesity. In fact, recent research coming from one of the best well-designed RCT so far, the PREDIMED study, showed that Mediterranean-style diets rich in extra-virgen olive oil or nuts (high in healthy fats and polyphenols) have proven to have more beneficial effects on cardiovascular risk factors and outcomes by reducing inflammation and oxidative stress compared to conventional low-fat diets [6].

Another important point for prevention and promotion strategies is to focus on the overall diet patterns or foods rather than single isolated nutrients. In this regard, Mozaffarian et al. 2011 [7] investigated the association between multiple lifestyle changes and long-term weight gain in non-obese. The results showed that four year weight change was most strongly associated with foods rich in refined grains or sugar such as potato chips (1.69 lb), potatoes (1.28 lb), sugar-sweetened beverages (1.00 lb), and also unprocessed red meats (0.95 lb), and processed meats (0.93 lb). In contrast, increased fruits (-0.49 lb), non-starchy vegetables (-0.22 lb), nuts (-0.57 lb), yogurt (-0.82 lb), and whole grains (-0.37 lb) each appear to protect against chronic weight gain. Such foods are part of the description of a healthy dietary pattern. The Mediterranean diet, for instance is characterized for a generous consumption of olive oil, high intake of plant foods (fruits, vegetables, legumes, unrefined cereals, nuts, and seeds), moderate consumption of fish, seafood, fermented dairy products (yogurt and cheese), poultry, eggs and wine, along with limited consumption of red and processed meat and sweets. Although the Mediterranean diet is a combination of multiple components that act synergistically, the individual components have shown protective effects of cardiovascular health specifically fruit and vegetables showed an inverse association with weight change [8,9]. Recent evidence showed that an increase in diet quality as assessed by the Mediterranean diet and also other dietary patterns describing a healthy diet over four year periods was associated with lower cardiovascular risk in the following four years, independent of other lifestyle factors [10]. These results

underscore the importance of promoting and sustaining a healthy diet for long-term health improvement and also agree with the 2015 Dietary Guidelines Advisory Committee that emphasized the importance of healthful, food-based diet patterns breaking the misconception of low fat diets.

Several other lifestyle factors appear to interact with diet to influence adiposity. These include physical inactivity, TV watching, smoking, and other emerging risk factors such as social network and sleep duration. Recent results showed stronger associations with lower odds of metabolic syndrome in combined rather than individual behaviors among Puerto Ricans living in U.S [11]. Other lifestyle factors were also independently associated with weight change, including physical activity (-1.76 lb); alcohol use (0.41 lb per drink per day), smoking (new quitters, 5.17 lb; former smokers, 0.14 lb), sleep (more weight gain with <6 or >8 hours of sleep), and television watching (0.31 lb per hour per day in three large prospective cohorts [7]. Working and school conditions such as shift work, long hours and environments not conducive to physical activity can also complicate efforts to exercise, eat healthy and obtain adequate sleep. Together, these observations highlight the need of holistic lifestyle behavioral strategies at home and in schools/workplaces to help improve those behaviors and prevent weight gain and other related diseases.

In sum, modern science shows that not all foods have the same influence in the metabolism and thus in weight regulation. Long-term weight prevention should be focus in the quality of the diet rather than in single nutrients, emphasizing the consumption of low glycemic foods such as olive oil, nuts, whole grains, legumes, vegetables or fruit. Low fat diet recommendations should be misplaces for healthy fats and high quality diets. A Mediterranean diet pattern is a good example because no food is completely forbidden and calorie counting is not required, thus the Mediterranean diet is easily adopted for long-term adherence. Because holistic behavioral approaches may be more advantageous than single modifications, strategies to improve a set of healthy lifestyles may be an effective real-life approach in primordial and primary prevention of obesity. Effective strategies should be designed and implemented at different levels namely in schools, where by intervening at an early age, when many behaviors are learned, strategies may have long-term impact on preventing obesity; or at worksites where maintaining employees' health is of great importance to prevent obesity and related disease and ultimately decrease sick leave, lost working days, or absenteeism [12]; or in communities to have a broader and crucial impact.

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