Reviewer's report

Title: Addressing overweight and obesity: a review of the biological models underpinning recent public health interventions

Version: 3 Date: 30 July 2012

Reviewer: Richard Feinman

Reviewer's report:

This MS argues that the persistence of overweight and obesity in the population rests in part a lack of translation between advances in understanding of the basic science," and in particular, reliance on the calories in-calories out philosophy with "little consideration of homeostatic feedback mechanisms and their effect on weight loss success." The MS includes a review of papers published in 2011 illustrating reliance on calories in-calories out.

The solution called for is "multidisciplinary approach in the design of future weight loss interventions" but it had little specific to offer and cites only one reference, an opinion article that urges untried and poorly conceived programs for taxation and other aversive government methods.

The idea that obesity research has not taken advantage of our understanding of basic science and has blindly insisted on calories alone is on target and has been voiced before. Research in carbohydrate restriction, in particular, has emphasized the basic biochemistry of the glucose-insulin axis. As a weight-loss strategy, the rationale of low-carbohydrate diets is that hormonal effects can over-ride the hemostatic mechanisms that the authors correctly point out as a key problem. Indeed, workers in the field probably feel that they have explicitly followed a model "considering the effect of diet composition including nutrient profile and interaction between nutrients and hormone regulating energy balance" as these authors have put it. There are numerous literature references and a few very serious popular books that could have been cited. There is a significant part of the population that follows such diets in a practical way. (The Active Low-Carber Forums, an internet support group, has more than 140, 000 members). The flip-side of the calories-only philosophy is that traditional nutritionists have given themselves the privilege of ignoring this work even as they begin to provide evidence for it. The current MS follows this practice but it is not acceptable.

While the authors point out that “the unique metabolic and hormonal effects of chronic and high consumption of refined carbohydrates, and in particular fructose and sugar sweetened beverages, has been linked with low satiation, poor appetite control and a lack of compensation for calories consumed over the short and long term” they do not discuss those metabolic effects and, as in much of the literature, are confusing appetite with metabolic, that is cellular control. In any case, these are not due solely to refined carbohydrates or sugars but all
carbohydrates -- in the obesity epidemic all carbohydrates, across the board went up and the strong prospective studies did not specify types of carbohydrate at all. Here are some of the papers that bear on this:


In the area of public health, the authors cite the USDA guidelines but do not cite the critique of the guidelines which specifically says that consideration of dietary carbohydrate restriction would offer the public strategies beyond "decrease the calories they consume and increase the calories they expend through physical activity."

The discussion of the cited studies describes the methods but do not discuss the results beyond "statistically significant short-term weight and/or fat losses were achieved in many of the studies, weight change was often small and weight regain was evident in a number of studies. This finding is supported by an existing literature which suggests that early weight loss is often regained over the long term...." 

The first statement needs more discussion -- some of the studies look like they were successful -- calories in-calories out is not completely useless idea. The second statement needs documentation. It is widely said that people regain the weight but anecdotally, generally not all: a net loss has to be considered good and the literature is weak on this data.

In summary, the details of the results of the tabulated data need to be discusses and the authors need to address the major alternative to the "calorie is a calorie" principle that they are critical of, namely dietary carbohydrate restriction. If they do not see this as a benefit, they can explain why but they cannot simply ignore this whole side of the literature.

**Declaration of competing interests:**

I have nothing to declare.