White Paper: Should Foods with Added Sugar Have Health Warning Labeling?

Tami Herndon
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One-third of US adults are obese, a rate that has more than tripled during the past four decades (Ogden, Carroll, Kit, & Flegal, 2014). Consumption of added sugar (including high-fructose corn syrup) is linked to obesity and obesity-related chronic diseases, such as heart disease and diabetes (Yang, Zhang, Gregg, Flanders, Merritt, & Hu, 2014). In addition, excess sugar consumption is now implicated in Alzheimer's disease (Willette, Bendlin, Starks, Birdsill, Johnson, & Christian, 2015). Should foods with added sugar contain warning labeling, alerting consumers to possible health risks? This white paper investigates the health risks of consuming added sugar and the effectiveness of warning labeling in order to make recommendations about warning labeling for foods with added sugar.

Background

Sugar was first cultivated in New Guinea about 10,000 years ago, spreading to all parts of the world between the 17th and 19th centuries (Sugar, 2015). High fructose corn syrup, a sweetener derived from corn, was developed in 1957 by Richard Marshall and Earl Kooi as an inexpensive alternative to sugar (Sugar, 2015). Once a sweet delicacy enjoyed exclusively by the upper class, added sugar now makes up at least 13% of the adult American's daily caloric intake, with many adults consuming 25% of their daily calories in sugar (Ervin & Ogden, 2013). The United States Department of Agriculture recommends fats and added sugar be limited to 5-15% of an adult's total daily caloric intake (USDA, 2010), and the World Health Organization advocates for 10% of daily caloric intake of added sugar (Yang et al., 2014).

Added Sugar

Added sugar is added to foods during processing or preparation (Johnson et al., 2009). Figure 1 lists major sources of added sugar in the US, as a percentage of all consumed added sugar.

Food Category	% of Total Added Sugar Consumed
Non-diet soft drinks	33.0
Sugar and candy	16.1
Cakes, cookies, pies	12.9
Sweetened fruit drinks	9.7
Dairy desserts and milk products	8.6
Other grains	5.8

Figure 1. Major Sources of Added Sugar in the United States (Guthrie & Morton, 2000).

Health Risks of Added Sugar

Negative effects of excess body fat. Obesity, characterized by excess accumulation and storage of body fat, is more than simply being overweight. Obesity puts individuals at risk for chronic disease, and the condition overburdens the US healthcare system with high costs. In the US, daily added-sugar consumption has increased by 19% to 22 teaspoons (355 calories) since the early 1970's (Johnson, Appel, Brands, Howard, Lefevre, & Lustig et al., 2009), fueling the steadily rising number of obese Americans – 78.6 million adults and 13 million children (Ogden et al., 2014).

Obesity is diagnosed when a person's body mass index (BMI) (a weight-to-height ratio used to determine over- or underweight conditions) is 20 or higher. At this level, individuals are at increased risk of having high blood pressure, type 2 diabetes, heart disease, stroke, and cancer. (Pi-Sunyer, Becker, Bouchard, Carleton, Colditz, & Dietz et al., 1998). The estimated annual cost of obesity in the US is $147 billion, and annual health care costs for obese persons are $1,429 higher than for persons of normal weight, as determined by BMI (Finkelstein, Trogden, Cohen, & Dietz, 2009).

Increased mortality from heart disease. Heart disease is the number one cause of death for men and women in America (Heart, 2015), costing the US healthcare system $108.9 billion per year (Heidenreich, Cogden, Khavjou, Butler, Dracup, & Ezekowitz et al., 2014). Consumption of added sugar is now a known contributing factor to heart disease. A recent 15-year study compared the chance of dying from heart disease among three groups: Group One consumed added sugar less than 10% of daily calories, Group Two consumed added sugar greater than 10% and less than 25% of daily calories, and Group Three consumed added sugar greater than 25% of daily calories (Yang et al., 2014). Figure 2 shows Members of Group Two were 1.3 times as likely to die from heart

disease as members of Group One, and members of Group Three were nearly three times as likely to die from heart disease as Group One (Yang et al., 2014).

Added Sugar Consumption as a % of Daily Calories	Group 1 <10%	Group 2 >10% - <25%	Group 3 >25%
Chance of dying from heart disease	-	1.3	2.75

Figure 2. Heart Disease Mortality Rate from Added Sugar Consumption as a Percentage of Daily Calories.

(Yang et al., 2014).

Statistics aside, the study showed that consuming excess added-sugar increases the risk of dying from heart disease even in individuals with an otherwise healthy lifestyle, including nutritionally-supportive foods and adequate physical activity, (Yang et al., 2014).

Increased incidence of diabetes. Type 2 diabetes accounts for 90-95% of all diabetes cases, affecting 29 million Americans (Diabetes, 2015). Typically diagnosed during adulthood, Type 2 diabetes is a condition when the body does not use insulin properly, also called insulin resistance (Insulin, 2015). Nutritionists say that insulin resistance begins when excess sugar consumption interferes with the body's hormonal cycles, most specifically the insulin cycle,
which manages how the body uses and stores sugar (Jabr, 2013). Some blame sugar-sweetened beverages for the strong increase in the incidence of insulin resistance and related obesity because a six-ounce increase in sugar-sweetened beverage intake can induce a 10% increase in food intake (Flood, Roe, Rolls, 2006). Pre-diabetes, an early stage of insulin resistance, that can be reversed with healthy diet and physical activity, affects another 8.1 million Americans (Diabetes, 2015). Diabetes, if left untreated, causes blindness, kidney failure, and nerve issues that lead to foot amputations (Insulin, 2015). The total annual cost of diabetes and pre-diabetes is $322 billion (Diabetes, 2015).

Impaired brain functioning and memory. Insulin resistance may also be linked to Alzheimer's disease. Alzheimer's is considered a disease of faulty brain signaling, and insulin is the hormone involved when brain cells transmit messages to each other (Willette et al., 2015). While the link between insulin resistance, a condition triggered by excess sugar consumption, and Alzheimer's is not completely established, researchers do know that insulin resistance prevents the brain from getting the nourishment needed for proper functioning, and Alzheimer's symptoms such as poor memory can develop (Willette et al., 2015).

Warning Labeling

In 1964, US Surgeon General Luther Terry reported that cigarette smoking increased the death rate of smokers over non-smokers by 70% (Surgeon General, 2015). By 1965, Congress had passed the Cigarette Labeling and Advertising Act requiring every cigarette package be labeled with the following: "Warning: Cigarettes may be hazardous to your health" (Tobacco, 2015). Currently, cigarette warning labels state specific health risks associated with smoking. Although 31% of people who quit smoking do so because of warning labels (Hammond, McDonald, Fong, Brown, & Cameron, 2004), lung cancer remains the leading cancerous cause of death in men and women (Lung, 2015).

In 1981, US Surgeon General Julius Richmond advised women who were pregnant, or considering pregnancy, to avoid drinking alcoholic beverages because of the potential for miscarriage or birth defects (FDA, 1981). By 1988, the Alcoholic Beverage Labeling Act required all alcoholic beverages to be labeled with: "GOVERNMENT WARNING: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects. (2) Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery, and may cause health problems." (Alcoholic, 2015). While the public supports the alcohol beverage labeling, the labels have had limited effect on the incidence of fetal alcohol syndrome, a birth defect (Thomas, Gonneau, Poole, & Cook, 2014).

In both cases, warning labeling failed to significantly reduce the use of cigarettes and alcoholic beverages. Ongoing research seeks to find a better way to convey important public health messages. More recently, the Food and Drug Administration (FDA) investigated the effectiveness of graphic warning labels on cigarette packaging (Figure 3). Early feedback indicates the graphic labels can motivate individuals to quit smoking (Gibson et al., 2015).
Despite high public awareness, research shows that alcohol warning label messages are unclear about the consequences of alcohol consumption. (Thomas, Gonneau, Poole, & Cooke, 2014).

Figure 3. FDA Graphic Cigarette Warning Labels. (Warning, 2015).

Recommendation

Although tobacco and alcohol warning labels have had limited effect, consumers, in general, know that smoking tobacco products and drinking alcohol pose risks to their health. In contrast, American consumers purchase thousands of so-labeled healthy food products that actually contain added sugar. Aside from allergy warnings, current nutritional labeling lacks information about potential health risks associated with food product ingredients (Labeling, 2013), vital information consumers need to make informed choices. A few examples of so-labeled healthy products that contain added sugar illustrate this point:

Honey Nut Cheerios (Cheerios, 2015), a cereal promoted as heart-healthy, has nine grams (a little over two teaspoons) of added sugar per three-fourth cup serving (General Mills, 2015). The sugar adds 36 calories to the cereal, one-third of the recommended daily added sugars for women and one-fifth for men (Yang et al., 2014). Note: Many consumers eat two times the recommended serving, so the amount of sugar increases to four teaspoons.

Del Monte Cream Style Corn (Corn, 2015), a healthy vegetable, has seven grams (2 teaspoons) of added sugar in a one-half cup serving (Del Monte, 2015). The sugar adds 28 calories to the corn, one-third of the recommended daily added sugars for women and one-fifth for men (Yang et al., 2014).

Campbell's Tomato Soup (Soup, 2015), a meat-free meal, has 12 grams (three teaspoons) of added sugar in a one-half cup condensed serving (Campbell's, 2015). The sugar adds 48 calories, one-half of the recommended daily added sugars for women and one-third for men (Yang et al., 2014). Note: Many consumers eat the entire can, 1 ½ cups, increasing the amount of sugar to nine teaspoons.

Conclusion

Consuming added sugar leads to obesity, heart disease, and diabetes, and new research indicates a possible connection between added sugar consumption and Alzheimer's disease. Obesity rates for both adults and children steadily rise despite public health efforts to improve American dietary choices. The average American consumes 13%-25% of daily calories in added sugar, levels shown to increase the risk of death from heart disease by one and a half to three times. Type 2 diabetes, a costly and debilitating disease, develops when sugar disrupts the human body's insulin cycles. Disrupted insulin cycles also contribute to symptoms of Alzheimer's disease, such as impaired brain functioning and poor memory.

So, should foods with added sugar have health warning labeling? Based on the evidence presented and the widespread use of added sugar in American food products, this white paper recommends health warning labeling for foods with added sugar similar to this - **Warning: This product contains added sugar, a known cause of obesity, heart disease, and diabetes.** The simple, straightforward message provides consumers with important information to help them make good choices about their health.

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