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Weight Loss

Weight loss strategies: Association with consumption of sugary beverages, snacks and values about food purchases

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ABSTRACT

Objective: To examine whether weight loss strategies are associated with consumption of sugar-sweetened beverages (SSBs), snacks or food values.
Methods: Cross-sectional analysis of 24-h dietary recall data obtained from the National Health and Nutrition Examination Survey 2007–2010 ($N = 9440$).
Results: Adults trying to lose weight consumed roughly 2000 total calories, 250 calories from SSBs, 225 calories from salty snacks, and 350 calories from sweet snacks. Adults not trying to lose weight consumed roughly 2300 total calories, 300 calories from SSBs, 250 calories from salty snacks, and 380 calories from sweet snacks. While overweight and obese adults trying to lose weight consumed fewer calories than those who were not, heavier adults trying to lose weight using dietary strategies or a combination of diet and physical activity consumed more calories than healthy weight adults using that same weight loss strategy ($p < 0.05$). Price (>70%) and nutrition (>50%) were most when making food choices ($p < 0.05$) for all groups.
Conclusion: Consumption of discretionary calories is high regardless of body weight or weight loss intention.
Practice implications: Promoting reduced SSB and snack consumption in the clinical setting may be important for weight loss, particularly among heavier individuals. Clinicians should consider values related to food purchasing to identify concrete behavioral targets.

1. Introduction

The obesity epidemic, which is associated with an increased burden of chronic conditions [1–3], affects a tenth of adults worldwide [4] and one third of American adults [5]. In the United States alone obesity costs $147 billion in healthcare spending annually [6]. Even modest weight loss can have a significant impact on the elimination or reduction of adverse health conditions associated with obesity [7,8], and recommendations for weight loss include both reduced caloric intake and increased physical activity [9].

Despite strong interest in weight loss programs in the United States – American adults spend tens of billions of dollars on commercial weight loss programs annually – the quality of the American diet is generally poor [10]. In particular, consumption of sugar-sweetened beverages (SSBs) and snacks – which are typically high in calories, fat, and sugar [11,12] – is high. Two-thirds of adults (63%) drink SSBs, averaging 28 ounces per day, and 293 calories daily (15% of recommended 2000 kcal/day diet) [13]. From 1977 to 2001, energy intake from soft drinks and fruit drinks increased by 135% [14] and the prevalence of adult obesity doubled [15]. Over the past four decades, rates of snacking have increased from 59% to 90%, making snacking a quarter of total energy intake [16–18].

There is a consensus in the literature that a reduction in excess calories is helpful in preventing or delaying the onset of excess weight gain. Moreover, the consumption of a relatively small number of excess daily calories can lead to weight gain [19,20]. While patterns of SSB [13,14,21,22] and snack [16–18] consumption are well described along with effective intervention strategies to reduce their consumption [23,24,11], there has been little research looking focused on whether consumption of these discretionary calories differs by weight loss strategies (i.e., diet, exercise, or diet and exercise combined). No research has examined whether the patterns of SSB and snack consumption associated with weight loss strategies differ by body weight status.

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While there is a knowledge base describing the motives underlying food selection [25,26], missing from the literature is evidence about whether individual values related to food purchasing differ by weight loss strategy or body weight status. Available studies focus on the overall population and find that values such as price, convenience and taste are key drivers of food consumption patterns [27]. Taken together, understanding the association between weight loss strategies, consumption of discretionary calories and food values is an important area of inquiry as it may help identify modifiable behavioral targets, particularly among overweight and obese adults.

The primary purpose of this study was to describe patterns of SSB and snack consumption by weight loss strategies among U.S. adults overall and by body weight category. The secondary purpose was to examine whether values related to food consumption (e.g., price, taste) were associated with weight loss strategies and body weight. This analysis does not attempt to estimate the impact of SSB or snack intake on obesity incidence given our reliance on cross-sectional data.

2. Methods and procedures

2.1. Data and design

Data was obtained from the nationally representative continuous National Health and Nutrition Examination Survey (NHANES). The NHANES is a population-based survey designed to collect information on the health and nutrition of the U.S. population. Participants were selected based on a multi-stage, clustered, probability sampling strategy. Our analysis combined the continuous NHANES data collection (2007–2010) to look at overall patterns during that time period. We selected 2007 as the start date for the study as that was the earliest year that our variables of interest were available. A complete description of data-collection procedures and analytic guidelines are available elsewhere (www.cdc.gov/nchs/nhanes.htm).

2.2. Study sample

The study sample consists of adults ages 20 and older with completed 24-h dietary recalls. Survey respondents were excluded if they were pregnant or had diabetes at the time of data collection or if their dietary recall was incomplete or unreliable (as determined by the NHANES staff). The final analytic sample included 9440 adults.

2.3. Measures

2.3.1. Intention to lose weight and weight loss strategies

Intention to lose weight was assessed by self-reported intentional weight loss of $\geq$10 pounds in the past year or an affirmative response to the survey question, "During the past 12 months, have you tried to lose weight?" Respondents who answered "yes" to either question were categorized as trying to lose weight and, "no", as not trying to lose weight. Respondents were first asked if they had intentional weight loss of $\geq$10 pounds, if they respond affirmatively, they are instructed to skip the next question regarding whether or not they were trying to lose weight. By using both questions to define weight loss intention, we captured individuals who succeeded in losing $\geq$10 pounds as well as those who were trying to lose weight but lost $<$10 pounds.

Respondents who reported trying to lose weight were further asked to report all of the ways they tried to lose weight. We categorized these weight control strategies into four mutually exclusive categories detailed in Appendix A: (1) dietary changes (e.g., ate less to lose weight, switched to foods with lower calories), (2) physical activity (e.g., exercised to lose weight, personal trainer), (3) diet and physical activity, or (4) commercial diet. We focused on adults using only dietary strategies or a combined approach of diet and physical activity to lose weight due to the small sample size in the physical activity alone and commercial weight loss groups. We excluded people from the analysis who exclusively took medication, laxatives, vomited or smoked cigarettes to lose weight due to small sample size and relevance.

2.3.2. Beverages and snacks

Survey respondents reported all food and beverages consumed in a prior 24-h period (midnight to midnight) and reported type, quantity and time of each food and beverage consumption occasion. Following the dietary interview, all reported food and beverage items were systemically coded using the U.S. Department of Agriculture (USDA) Food and Nutrient Database. Caloric content and other nutrients derived from each consumed food or beverage item were calculated based on the quantity of food and beverages reported and the corresponding nutrient contents by the National Center for Health Statistics (NCHS). We used the first dietary recall from each survey for this analysis.

We identified SSBs (from 162 beverage items) including the following drink types: soda (22 items), sport drinks (4 items), fruit drinks and punches (59 items), low-calorie drinks (25 items), and sweetened tea and other sweetened beverages (52 items). We identified two mutually exclusive snack categories (from 772 snack items): (1) salty snacks (including hush puppies, all type of chips, popcorn, pretzels, party mixes, French fries, and potato skins (76 items) and (2) sweet snacks, including ice cream, other desserts (custards, puddings, mousse, etc.), sweet rolls, cakes, pastries (crepes, cream puffs, strudels, croissants, muffins, sweet breads, etc.), cookies, pies, candy (696 items). The sweet snack category did not include solid foods with naturally occurring sugar such as fruit. See Appendix B for more details.

2.3.3. Food consumption values

Respondent food consumption values were based on responses to a series of questions assessing the importance of several domains (price, nutrition, taste, ease of food preparation, how well food keeps) related to food purchases. For example, the exact survey question for the price domain is: "When you buy food from a grocery store or supermarket, how important is price? Would you say that it is very important, somewhat important, not very important or not at all important?" Each domain had the same response categories. We dichotomized each food consumption value as very important vs. otherwise based on the cut points in the data. In particular the data were skewed toward more positive responses, so combining the categories for 'very' and 'somewhat' into a single category left insufficient variation for the analyses.

2.3.4. Body weight status

In the NHANES, body weight and height were measured using standard procedures in a mobile examination center. Healthy weight was defined as a body mass index (BMI) from 18.5 to 24.99 kg/m^2; overweight, BMI from 25 to 29.99 kg/m^2; and obese, BMI $\geq$30 kg/m^2 [28].

2.3.5. Other measures

Sociodemographic measures were categorized as follows: race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican-American and other), sex, age, marital status (married, married before, living with a partner, never married), education (less than high school, high school, more than high school) and employment status (unemployed (including retirees and those not actively looking for work), employed). The "other race" category includes non-Hispanic multiracial individuals and other non-Hispanic race