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Research report

Potential effect of physical activity based menu labels on the calorie content of selected fast food meals ☆

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ABSTRACT

In this study we examined the effect of physical activity based labels on the calorie content of meals selected from a sample fast food menu. Using a web-based survey, participants were randomly assigned to one of four menus which differed only in their labeling schemes ($n = 802$): (1) a menu with no nutritional information, (2) a menu with calorie information, (3) a menu with calorie information and minutes to walk to burn those calories, or (4) a menu with calorie information and miles to walk to burn those calories. There was a significant difference in the mean number of calories ordered based on menu type ($p = 0.02$), with an average of 1020 calories ordered from a menu with no nutritional information, 927 calories ordered from a menu with only calorie information, 916 calories ordered from a menu with both calorie information and minutes to walk to burn those calories, and 826 calories ordered from the menu with calorie information and the number of miles to walk to burn those calories. The menu with calories and the number of miles to walk to burn those calories appeared the most effective in influencing the selection of lower calorie meals ($p = 0.0007$) when compared to the menu with no nutritional information provided. The majority of participants (82%) reported a preference for physical activity based menu labels over labels with calorie information alone and no nutritional information. Whether these labels are effective in real-life scenarios remains to be tested.

Introduction

More than one-third of adults in the United States are obese, and obesity is a significant risk factor for heart disease, stroke, hypertension, and type 2 diabetes (Flegal, Carroll, Kit, & Ogden, 2012; U.S. Department of Health and Human Services, 2001). The obesity epidemic has been linked to changes in the American diet and inadequate levels of physical activity, both products of many environmental factors (Variyam, 2005). Americans consume almost one-third of their daily calories from food purchased away from the home (Variyam, 2005). With higher calorie and fat content, lower calcium and fiber content, and a larger portion size, food purchased away from the home has been implicated in the high prevalence of obesity (Guthrie, Lin, & Frazao, 2002; Powell, Nguyen, & Han, 2012; Bowman & Vinyard, 2004). Fast food consumption is associated with weight gain and insulin resistance, which increase the risk of obesity and type 2 diabetes (Bowman & Vinyard, 2004; French, Harnack, & Jeffery, 2000; Pereira, Ebbeling, Slattery, & Ludwig, 2005).

Policymakers are exploring new strategies to curb the obesity epidemic. One policy measure is the mandate included in the 2010 Patient Protection and Affordable Healthcare Act that restaurants post nutrition information on their menus. This requirement expands upon the 1994 Nutrition Label and Education Act which requires standardized nutrition labels on packaged foods. Under this new menu labeling mandate, restaurants with 20 locations nationally will be required to display "clear and conspicuous" calorie information for the food on their menus and menu boards. Since food away from home is a significant part of the American diet, providing consumers with information on the calorie content of this food would theoretically make them more informed and potentially encourage lower calorie purchases. New York City, Philadelphia, the state of California, and a number of other cities have taken the lead in implementing menu labeling at chain restaurants (Center for Science in the Public Interest, 2011).

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However, studies on the impact of menu labeling on adult and adolescent calorie consumption are conflicting (Elbel, Gyamfi, & Kersh, 2011; Elbel, Kersh, Brescoll, & Dixon, 2009; Harnack & French, 2008; Roberto, Larsen, Agnew, Baik, & Brownell, 2010; Temple, Johnson, Recupero, & Suders, 2010; Vadiveloo, Dixon, & Elbel, 2011). Harnack and French reviewed six studies that examined the effect of menu calorie labeling on consumer choices at cafeterias and restaurants. Of these, five found menu labeling had an effect on calories consumed or had an effect on the calories people intended to purchase. However, those studies that found menu labeling lowered calorie consumption were compromised by methodological flaws. We recently updated this systematic review identifying seven additional studies, two of good quality, and concluded that current evidence suggests that calorie labeling does not have the intended effect of decreasing calorie purchasing or consumption (Swartz, Braxton, & Viera, 2011).

Calorie information alone may not be sufficient to inform consumers and motivate behavior change. Individuals may not understand what calories mean and how the calorie content of an individual item fits into their daily caloric intake (Blumenthal et al., 2010; Fitch et al., 2009). Framing this calorie, or energy intake, information by indicating the percent of daily intake it represents, or the amount of physical activity required to burn these calories may increase its influence on consumer behavior (Blumenthal et al., 2010; Bleich & Pollack, 2010; Roberto et al., 2010). In a survey of low income New York City residents, Elbel found only one third of participants knew the recommended daily calorie intake, and this was unchanged after the implementation of calorie labeling. However, less than 10% estimated that the daily calorie intake was above 2500 calories so most did not overestimate the recommended daily intake (Elbel, 2011). A recent study among African American adolescents in a low income neighborhood suggests menu labeling with relative calorie information, in terms of physical activity equivalents, may influence consumers more than absolute calorie information. Compared to calorie information alone, calorie information with physical activity equivalents had a significant effect in reducing the odds of buying a sugar sweetened beverage (Bleich, Herring, Flagg, & Gary-Webb, 2012). In a nationally representative sample, a quarter of Americans reported they would like to see physical activity equivalents provided with calorie information (Bleich & Pollack, 2010).

Another study conducted in a laboratory setting found that a convenience sample of participants preferred calorie information with an interpretation aid such as recommended calories per meal, or recommended daily calorie intake, over the number of minutes of running that would be required to burn the calories in that item (Fitch et al., 2009). Critiques of the physical activity labels included that it had limited generalizability since many people are not able to run, it was discouraging, and most people interpreted the label as a recommendation for exercise rather than a decision making tool that could be used to compare items under consideration (Fitch et al., 2009).

Most consumers express interest in seeing the calorie content of foods they purchase (Bleich & Pollack, 2010; Lando & Labiner-Wolfe, 2007). About half of consumers indicate they would be more likely to eat at a restaurant with posted calorie information (Bleich & Pollack, 2010). A physical activity label could be a complement to this calorie information and allow people to better appreciate the trade-offs of added calories. Therefore, we examined whether a physical activity based label added to calorie information would influence the calorie content of meals selected from a sample fast food menu. Our hypothesis was that physical activity based labels would encourage lower calorie meal selections when compared to menus with no nutritional information and menus with calorie information alone.

Methods

Label design

A series of focus groups was used to design consumer friendly physical activity based labels. Based on the feedback of focus group participants, two physical activity based labels were developed and then used in this study. One provides consumers with the number of miles to walk to burn the calories in each item, while the other provides consumers with the number of minutes to walk to burn the calories in each item. Focus group participants overwhelmingly expressed their interest in seeing physical activity based labels on menus (unpublished data).

To calculate average energy expenditure for labels depicting running or walking, we used an average body weight of 160 lb. We used an energy expenditure chart that listed estimated calories burned by activity and body weight (Blair, Dunn, Marcus, Carpenter, & Jaret, 2001). For labels depicting walking, we used the energy expenditure of a 160 lb adult walking at a rate of 30 min per mile (3.2 kcal/min). For running, we used the energy expenditure of a 160 lb adult running at a rate of 10 min per mile (12.8 kcal/min). To determine the number of minutes required to burn off calories in a food item, we divided the total calories in the item by the energy expenditure rate. To calculate the number of miles that would be required to expend the calories in a food item, we divided the total time required by the running or walking pace. Sample calculations are included (Appendix B). We fielded three focus groups with eight participants in the first group and six in each of the subsequent groups. Over half (65%) of participants were female and 45% were white. More than half (65%) of participants lived with a significant other, less than half (35%) lived with children, and the majority of participants (90%) had adequate health literacy.

Study population

Our study was approved by the University of North Carolina at Chapel Hill Institutional Review Board and all participants were consented online before they could proceed to the survey. We obtained permission from the University of North Carolina at Chapel Hill (UNC) Human Resources Department to sample UNC employees working throughout the medical center and the medical school for this study. The university has a weekly, online employee newsletter for the medical center and another one for the medical school. A short post about the study was included in these newsletters and then re-posted in the newsletters two weeks later as a reminder. The post included a link to our online survey. One week after the reminder post, the survey was closed. According to the Medical Center Public Affairs Department, the UNC Healthcare newsletter, for medical center employees, goes out to 8500 people and the UNC Medical School newsletter goes out to 4200 people making our potential target study population a total of 12,700 UNC employees. Participants were eligible for the study if they were at least 18 years old and if they had eaten at a fast food restaurant at least once in their lifetime. Interested participants who completed the survey were entered into a drawing to receive one of four $100 VISA gift cards. Survey volunteers were randomly assigned to one of four versions of an online survey designed using Qualtrics software (Qualtrics Labs Inc. 2008). Versions differed only in their menu labeling schemes. In survey version 1 the sample fast food menu had no nutrition labels; version 2 included calories for each item; version 3 included labels with both calories for each item and the number of minutes of walking needed to burn those calories, and version 4 included labels with both calories for each item and the number of miles of walking needed to burn those