Preventive Medicine 100 (2017) 112–116

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Calorie changes in large chain restaurants from 2008 to 2015

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ARTICLE INFO

Article history:
Received 28 November 2016
Received in revised form 3 March 2017
Accepted 2 April 2017
Available online 4 April 2017

Keywords:
Menu labeling
Chain restaurants
Calories

ABSTRACT

No prior studies examining changes in the calorie content of chain restaurants have included national data before and after passage of federal menu labeling legislation, required by the 2010 Affordable Care Act. This paper describes trends in calories available in large U.S. chain restaurants in 2008 and 2012 to 2015 using data were obtained from the MenuStat project (2012 to 2015) and from the Center for Science in the Public Interest (2008). This analysis included 44 of the 100 largest U.S. restaurants which are available in all years of the data (2008 and 2012–2015) (N = 19,391 items). Generalized linear models were used to examine 1) per-item calorie changes from 2008 to 2015 among items on the menu in all years and 2) mean calories in new items in 2012, 2013, 2014 and 2015 compared to items on the menu in 2008 only. We found that Among items common to the menu in all years, overall calories declined from 327 kcal in 2008 to 318 kcal in 2015 (p-value for trend = 0.03). No differences in mean calories among menu items newly introduced in 2012, 2013, 2014, and 2015 relative to items only on the menu in 2008 were found. These results suggest that the federal menu labeling mandate (to be implemented in May 2017) appears to be influencing restaurant behavior towards lower average calories for menu items.

1. Introduction

After many delays, the federal menu labeling provision of the Anon. (2010) Affordable Care Act (ACA) will be implemented nationally on May 5, 2017 (Food and Drug Administration, 2016). The rule mandates that calorie information be posted on menus and menu boards (2010) in restaurants or similar retail food establishments with more than 20 outlets. The rule applies to a wide variety of food outlets such as bakeries, cafeterias, coffee shops, convenience stores, delicatessens, food service facilities located within entertainment venues (such as amusement parks, bowling alleys, and movie theatres), food service vendors (such as ice cream shops and mall cookie counters), food take-out and/or delivery establishments (such as pizza take-out and delivery establishments), grocery stores, retail confectionary stores, superstores, quick service restaurants, and table service restaurants (Food and Drug Administration, 2014).

Menu labeling was conceptualized as a tool to give consumers better information about their food purchases, although rigorous evaluations of these efforts generally show little or no impact on short-term consumer purchasing behavior (Breck et al., 2014; Dumanovsky et al., 2011; Long et al., 2015; Sinclair et al., 2014; Swartz et al., 2011; Tandon et al., 2011; Vadiveloo et al., 2011) or long-term consumer purchasing behavior (Hammond et al., 2015; Tandon et al., 2011). However, the impact of menu labeling on restaurant food consumption may be mostly realized through restaurant industry's reformulation of products to have fewer calories. There is evidence that many large restaurants have implemented self-regulatory actions to increase the transparency of nutritional information in anticipation of the menu labeling regulations (Schreiner, 2008). These self-regulatory activities appear to have already resulted in reductions to the caloric content of menu items. Specifically, in two recent studies we examined 66 of the 100 largest U.S. chain restaurants and observed voluntary reductions to the calories in newly introduced menu items by 60 cal (or 12% decline) from 2012 to 2013 (Bleich et al., 2015a) which persisted in 2014 (Bleich et al., 2016). Among fast food restaurants, we found that the macronutrient composition of menu items has not notably shifted overall, but among some menu categories (appetizers, sides, main courses) this decline in calories among new items appears to be driven by a decrease in calories from unsaturated fat and increases in calories from sugar (Jarlenski et al., 2016). We also compared differences in calorie counts of food items between restaurants that voluntarily implemented national menu labeling and those that did not and found that the mean per item calorie content from 2012 to 2014 was lower for restaurants that voluntarily posted information about calories (Bleich et al., 2015b).

Other research examined trends in calorie content of lunch/dinner menu offerings at eight of the leading fast-food chain restaurants in

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http://dx.doi.org/10.1016/j.ypmed.2017.04.004
0091-7435/

the U.S. over 14 years from 1997/1998 to 2009/2010 and found few changes in median calorie content, although the number of new menu items increased substantially by 53% over the period (Bauer et al., 2012). Another study analyzed changes in calorie content of main entrées in 213 U.S. chain restaurant (all of which were among the top 400 U.S. chain restaurant brands) between spring 2010 (when the federal menu labeling requirement was passed) and spring 2011 found no meaningful changes overall, although mean calories in children's menu entrées decreased by 40 kcal (Wu and Sturm, 2014).

The results from these earlier studies do not provide evidence about changes in calories in chain restaurants prior to and after the passage of the federal menu labeling rule in 2010. This is important for improving our understanding of restaurant-driven changes in calories, which have the potential to significantly impact the public's health. Exposure to restaurants is high. There are 990,000 restaurant locations in the U.S and sales from the restaurant industry total over $650 billion annually, which is equivalent to 4% of U.S. gross domestic product (Association, 2014). On a typical day, more than 1/3 of Americans consume fast food (33% of children, 41% of adolescents, and 36% of adults), with a mean caloric intake among consumers of 576 cal, 988 cal, and 877 cal, respectively (Powell et al., 2012). Reducing purchases in chain restaurants by approximately 60 cal (the average decline we observed in newly introduced menu items in 2013 and 2014) (Bleich et al., 2015b; Bleich et al., 2016) may contribute to a meaningful reduction in the number of daily excess calories underlying the obesity epidemic in adults (220 cal per day) (Hall et al., 2011) and in children (165 cal per day) (Wang et al., 2006).

To understand trends in calorie changes in chain restaurants before and after the passage of the menu labeling rule, we obtained an additional year of restaurant menu item data from 2008. Other studies examining the potential impact of the menu labeling rule on calorie changes in chain restaurants rely on data collected during (Wu and Sturm, 2014) or after the passage of the rule (Bleich et al., 2015a; Bleich et al., 2016; S. N. Bleich et al., 2015b); therefore lacking a baseline period for comparison. Specifically, for this study, we examined whether mean calories prior to the passage of the menu labeling rule were higher than mean calories after the menu labeling rule and whether the mean calories of items available only in 2008 was different than those of items newly introduced to menus in 2012 to 2015. The study hypothesis is that mean per-item calories will remain the same for items commonly on the menu in all years, and that mean per-item calories for newly introduced menu items will be higher in 2008 than in later years.

2. Methods and procedures

2.1. Data

The data for this analysis were obtained from MenuStat (http://menustat.org/) for 2012 to 2015. The MenuStat data includes information about menu items in a majority of the 100 largest U.S. restaurant chains. We restricted the data to 66 of the 100 largest U.S. restaurants, which are available in all four years of the data (2012–2015). The MenuStat database includes caloric information about menu items made public by restaurants on their websites. The MenuStat team categorized each of the menu items into one of 12 mutually exclusive menu categories. Detailed methods can be found on the MenuStat website (New York City Department of Health and Mental Hygiene, 2014). Data from the Center for Science in the Public Interest (CSPI) was used to capture calories for menu items in 2008. Similar to the MenuStat data, the data from CSPI includes calorie information about menu items in large chain restaurants in the U.S. and was downloaded directly from the publicly available caloric information on restaurant websites.

Of the 66 restaurants with information available in 2012–2015 (from the MenuStat database), 56 also had information available in 2008 from CSPI. To ensure completeness and comparability between the Menustat and CSPI data, while also ensuring maximum sample size, restaurants were included in the analysis if at least 20% of the core menu items (items available in all years 2012–2015) were also present in the 2008 data. A total of 12 restaurants were excluded for not meeting this criteria. Although this is a convenience sample, this method maximizes comparability of restaurants' menus over time, which is central to our study hypothesis. We conducted sensitivity analyses describing the results at 25% and 30% overlap in the menu items (Supplemental Appendix, Tables A2 and A3 (25%) and Tables A4 and A5 (30%)). In other words, we re-ran the main analyses using different thresholds for restaurant inclusion criteria based on the percent of menu items that were present on the menu in 2012–2015 and also included in the 2008 data. Here we wanted to test whether varying the analytic sample based on overlap in core menu items available across the study period impacted our findings. The results do not change substantively at different levels of menu item overlap. We also conducted sensitivity analyses examining missingness by menu item category (Supplemental Appendix, Table A6). Here we wanted to test whether the missingness of menu items is differentially higher in certain menu item categories. So, we calculated the percentage of menu items available in each of years 2012 to 2015 and in 2008 data. The results suggest that missingness of menu items appears relatively consistent across different menu categories. The observed level of missingness is consistent with earlier research showing that the number of new menu items fast food restaurants increases substantially overtime (Bauer et al., 2012).

The final analytic sample included a total of 44 restaurants (Supplemental Appendix, Table A1).

2.2. Measures

We examined two continuous outcomes: 1) the mean within-item change in calories from 2008 to 2015, among items on the menu in all years; and 2) the difference in mean per-item calories, comparing menu items newly introduced in 2012, 2013, 2014 and 2015 to those items on the menu in 2008 only. We defined menu items offered in all years as those items with the same item name and description within a given restaurant and menu category in each year of the study (2008 and 2012–2015). Based on the definition from the Menustat team, new menu items in each of the study years (2012–2015) were defined as those items which had no item name, description, or calories recorded in 2008, but did have an item name, description, and calories recorded in the present year (e.g., new menu items in 2014 were defined as those that had no item name, description, or calories recorded in 2008, 2012, or 2013, but did have an item name, description, and calories recorded in 2014 only or in both 2014 and 2015). Because menu items that had an item name, description and calories recorded in 2012–2015 were used as the "core" menu items upon which inclusion criteria was based for the 2008 data, those core items were not included among the items defined as "new in 2012" and were excluded from analysis.

For the first outcome (within-item calorie changes from 2008 to 2015, among items on the menu in all years), the main independent variable was a year indicator. For the second outcome (difference in calories between newly introduced items vs. old items comparing menu items newly introduced in 2012, 2013, 2014 and 2015 to those items on the menu in 2008 only), the main independent variable was an indicator of whether a menu item was on the menu only in 2008, newly introduced in 2012, newly introduced in 2013, newly introduced in 2014, or newly introduced in 2015.

Menu items were classified as foods, beverages, appetizers, main courses, desserts or toppings/ingredients by the MenuStat team. Coffee beverages were identified based on item descriptions (the definition method can be found in the Supplemental Appendix). Analyses were conducted overall and among the menu item categories above. We included item-level covariates (children's menu item status). We included restaurant-level covariates: 1) whether a restaurant was national