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Nutrition Menu Labeling May Lead to Lower-Calorie Restaurant Meal Choices for Children

Pooja S. Tandon, Jeffrey Wright, Chuan Zhou, Cara Beth Rogers and Dimitri A. Christakis

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WHAT'S KNOWN ON THIS SUBJECT: Fast food is increasingly popular and is associated with higher-calorie, less-nutritive meals. Most restaurants do not provide nutrition information at the point of purchase. Nutrition labels have been advocated as a means to decrease restaurant consumption of calories.

WHAT THIS STUDY ADDS: This study is the first to suggest that labeled menus may lead to significantly lower calorie content in restaurant meals purchased for children. Families that saw nutrition-calorie menus chose ~420 J (~100 cal) less than families that did not.

abstract

OBJECTIVE: Our aim was to determine whether nutrition labeling on menus would lead to lower-calorie choices for children.

METHODS: We performed a randomized, controlled experiment in a primary care pediatric clinic in Seattle, Washington. Parents of children 3 to 6 years of age presenting for an appointment were eligible. Parents were ineligible if they never ate fast food, if they were not English speaking, if their child was too sick, or if they had already participated. This was a convenience sample, with randomization performed in blocks of 6. Parents were presented with a McDonald's menu and were asked to select meals for themselves and their child. The menus were identical for both groups except for the presence of nutrition information for the intervention group.

RESULTS: There were 99 participants, for a participation rate of 82%. There were no significant differences in demographic characteristics between the groups. Parents in the intervention arm ordered an average of 102 fewer calories for their children than did control subjects (567.1 cal vs 671.5 cal; $P = .04$). With adjustment for parent's gender, race, education, and BMI, fast food frequency, and child's BMI *z* score, the difference remained significant ($P = .004$). There was no difference in energy between the 2 groups in the parents' choices for themselves.

CONCLUSION: This study is the first to suggest that labeled menus may lead to significantly lower calorie content in restaurant meals purchased for children. *Pediatrics* 2010;125:244–248

AUTHORS: Pooja S. Tandon, MD,[a,b] Jeffrey Wright, MD,[b] Chuan Zhou, PhD,[a,b] Cara Beth Rogers,[a] and Dimitri A. Christakis, MD, MPH[a,b]

[a]Center for Child Health, Behavior, and Development, Seattle Children's Research Institute, Seattle, Washington; and [b]Department of General Pediatrics, University of Washington, Seattle, Washington

KEY WORDS

menu labeling, childhood obesity, fast food

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Address correspondence to Pooja S. Tandon, MD, Seattle Children's Research Institute, 1100 Olive Way, Suite 500, MPW 8-1, Seattle, WA 98101. E-mail: pooja@u.washington.edu

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The obesity epidemic has paralleled the increasing popularity of eating fast food. The proportion of foods that children consumed from restaurants increased ~300% between 1977 and 1996.[1] National survey data showed that nearly 25% of children 4 to 8 years of age consumed fast food on a typical day.[2] People consume almost twice as many calories when their meals are eaten at restaurants instead of at home, with more saturated fat and less fiber and calcium than in home-cooked meals.[3–5] A report by the World Health Organization and the Food and Agriculture Organization of the United Nations concluded that the marketing of energy-dense foods and fast food outlets is a "probable" cause of increasing obesity.[6] Given these trends, the Institute of Medicine has recommended nutrition labeling as 1 of its 10 national public health priority recommendations for prevention of childhood obesity.[7]

Cross-sectional studies have found that consumers who report using food labels on packaged foods have healthier diets.[8,9] However, most restaurants, if they provide nutrition information at all, do so in ways that are not easy for people to use when ordering (eg, on Web sites or tray-liners). In a study of 300 of the largest chain restaurants, 54% made some nutrition information available, but 86% of those provided the information only on a Web site.[10]

Some jurisdictions across the country have passed regulations that require chain food establishments to provide nutrition information through labeling on menus and menu boards.[11,12] As other communities consider similar menu labeling laws, it is important to understand what impact this may have on restaurant food purchasing for families and what role this policy may play in childhood obesity prevention. To our knowledge, no studies have examined the impact of nutrition labeling on fast food choices for children. The primary aim of this study was to test the hypothesis that nutrition labeling would result in lower-calorie meal choices by parents for their children.

METHODS

Setting and Subjects

Between October 2008 and January 2009, we conducted a randomized, controlled experiment in a pediatric primary care clinic in Seattle, Washington. Parents of children 3 to 6 years of age presenting for a sick- or well-child appointment were invited to participate by 1 of 2 research personnel in the waiting area. If there was >1 child in the family in the eligible age range, then the parent was asked to choose 1 for the study. Parents were ineligible if they stated that they never go to fast food or McDonald's restaurants with their child, if they were not English-speaking, if their child was too sick that day, or if they had already participated. We aimed for a sample size of 100, on the basis of a power calculation to detect an average difference of 100 cal in the intervention group, with a type I error rate of .05. The study procedure was approved by the Seattle Children's Hospital institutional review board.

Data Collection

Participating parents were presented with a McDonald's picture menu and were asked to select what they might order for themselves and their child if their next meal were at McDonald's. They were asked to circle their choices on menus labeled "child" and "parent" and to make their choices as they would in a restaurant, involving their children to the extent that they would under normal circumstances.

The menus offered the majority of items sold at McDonald's, including a variety of sandwich and chicken entrees, French fries, salads, drinks, desserts, and children's "Happy Meal" options. The sandwiches ranged from hamburgers (250 cal) to Big Macs (540 cal). Different serving sizes of chicken nuggets, with a variety of sauces, were potential options. We included 4 different varieties of salads, with optional grilled or fried chicken and low-fat and regular dressings. Happy meals included options of a hamburger, a cheeseburger, or a 4-piece serving of chicken McNuggets as the entrée. Participants also could choose a small serving of French fries or apple dippers as a side item and juice, low-fat milk, or a small fountain drink as the drink. Fountain drinks included a range of diet and regular fountain beverages, in small, medium, and large sizes. Milk shakes and bottled water also were options. Five different desserts, including the fruit and yogurt parfait (160 cal) and the McFlurry dessert (550 cal), were included. Families were asked to circle any dressings or sauces they would request and to indicate sizes of items, if applicable.

The information was collected anonymously. All menus had prices listed under each item, which were based on current pricing from local McDonald's restaurants. The menus for the 2 groups were identical except for the presence of calorie information for the intervention group, which was printed next to the price for each food item, in the same size and font. The calorie information was obtained from the McDonald's Corporation Web site in October 2008. The sample menus are available from the authors on request.

Participants were assigned randomly to either arm in blocks of 6, to achieve similar-sized intervention and control groups. Sociodemographic information, heights and weights of parents and children, and information about the frequency and reasons for eating fast foods were collected through anonymous self-reports. The majority

of children were weighed and measured on the day of their visit, and parents could report this information on the survey form. Participating families were offered a $5.00 coffee shop gift card as a token of appreciation.

Statistical Analyses

All statistical analyses were conducted by using Stata 10 (Stata, College Station, TX). Descriptive statistics for demographic and other subject characteristics were determined; χ^2 tests and *t* tests were used to compare intervention and control groups with respect to categorical and continuous variables, respectively. BMI values and *z* scores were calculated on the basis of self-reported heights and weights. We calculated total energy by aggregating values across all items selected. Because the energy data for both children and parents were skewed, we used the nonparametric Wilcoxon rank sum test to test our primary hypothesis. The energy data for both children and parents were distributed more normally when logarithmically transformed; therefore, the logarithmically transformed variable was used as the outcome in a linear regression model.

TABLE 1 Participant Characteristics

	Total	Intervention Group	Control Group
Sample size, *N*	99	51	48
Child's age, mean ± SD, y	4.3 ± 1.2	4.3 ± 1.2	4.3 ± 1.1
Child's gender female, %	49	46	51
Parent's age, mean ± SD, y	38.1 ± 7.6	36.5 ± 7.2	39.7 ± 7.7
Parent's gender female, %	77	78	79
Parent's highest education, %			
High school or less	11	16	6
More than high school	88	84	94
Annual household income, %			
Less than $40 000	20	22	17
$40 000–$60 000	7	6	8
More than $60 000	73	72	75
Parent's race/ethnicity, %			
Hispanic	8	12	4
White	75	70	82
Black	5	9	0
Pacific Islander	2	2	3
Asian	12	15	8
American Indian/Alaska Native	2	2	3
Other	4	2	4
WIC recipient now or in past, %	26	27	25
Frequency of eating fast food in past month, mean ± SD, times	2.4 ± 2.8	2.4 ± 2.6	2.5 ± 3.0
0 times, %	24	28	19
1 or 2 times, %	36	30	42
3 or 4 times, %	26	22	30
≥5 times, %	14	20	9
Parent's BMI, mean ± SD, kg/m^2	26.1 ± 6.4	26.4 ± 6.9	25.8 ± 5.7
Normal (<25 kg/m^2), %	50	51	50
Overweight (25–30 kg/m^2), %	30	29	29
Obese (>30 kg/m^2), %	20	20	21
Child's BMI, mean ± SD, kg/m^2	16.1 ± 2.6	16.6 ± 2.7	15.5 ± 2.4

WIC indicates Supplemental Nutrition Program for Women, Infants, and Children.

RESULTS

Of 159 families invited to participate, 121 were eligible and 99 completed the survey, for a participation rate of 82%. Of the parents surveyed, 77% were mothers, 75% were white, 88% had more than a high school education, and 62% reported eating fast food 1 to 4 times in the past month (Table 1). The most common reasons cited for eating fast food were that it is "quick/easy," "cheap," and "fun." The 2 groups were similar with respect to parent's gender, race/ethnicity, education, income, fast food eating frequency, reasons for eating fast food, and BMI values. There was no significant difference in energy ordered for the parent or the child between the group that reported not going to a fast food restaurant in the past month and the rest of the sample. There also was no correlation between frequency of fast food consumption and energy ordered in either group. There was a positive correlation between energy ordered for the parent and energy ordered for the child ($r = 0.3$; $P = .02$).

Parents in the intervention arm ordered an average of 102 cal fewer for their children than did those in the control arm (567.1 cal vs 671.5 cal; $P = .04$). In the regression analysis adjusting for parent's gender, race, education, and BMI, fast food frequency, and child's BMI *z* score, we found that the nutrition-labeled menu, on average, reduced energy ordered by 20% ($\beta = -0.226$; $P = .004$). There was no difference in the parents' energy between the 2 groups (Table 2).

DISCUSSION

Our findings are the first to suggest that labeled menus may lead to significantly lower-calorie choices in restaurant meals purchased for children. We found a difference of ~100 cal between the intervention and control groups. Hill et al[13] estimated that small changes in behavior that affect energy balance by ~100 kcal per day could avert weight gain in most adults. In children, estimates of the energy gap, that is, the daily imbalance between energy intake and energy expenditure resulting in overweight, vary from 46–72 kcal per day to 110–165 kcal

TABLE 2 Calories Ordered for Parent and Child

	Total, cal[a]	Intervention Group, cal[a]	Control Group, cal[a]	*P*	
				Unadjusted[b]	Adjusted
Child's meal total					
Mean	618.7	569.1	671.5	.04	.004[2]
SD	240.9	208.1	263.5		
Median	530	520	590		
Range	250–1390	250–1390	150–1190		
Parent's meal total					
Mean	762.6	765.9	759.3	.49	.9[3]
SD	455.4	385.9	523.5		
Median	710	760	685		
Range	60–2580	90–1750	60–2580		

[a] 1 cal = 4.184 J.
[b] Two-sample, Wilcoxon, rank sum (Mann-Whitney) test.
[c] Adjusted for parent's gender, race, education, and BMI, fast-food frequency, and child's BMI *z* score.
[d] Adjusted for parent's gender, race, education, and BMI and fast-food frequency.

per day.[14,15] Previous studies found that eating at fast food restaurants was associated with an additional 126 kcal per day, and there is evidence that eating fast food is associated with weight gain.[16,17] Given the frequency of fast food consumption, even modest reductions in calories (eg, 50–100 kcal) might have a significant impact on population-level calorie intake.[13,18] These benefits might be enhanced if menu labeling has the additional benefit of causing restaurants to offer healthier options.

Notably, we failed to find an effect with respect to parents' food choices. A recent meta-analysis of studies from peer-reviewed journals that evaluated energy labeling of menu items in restaurants and cafeterias found mixed results with respect to adults.[19] Five of the 6 studies reviewed provided some evidence that nutrition information influences food choices, but the effect may be weak or inconsistent; 1 study found no evidence of an effect. All of the studies used quasiexperimental designs, which limited internal validity. The authors concluded that research of more-rigorous quality and design is needed and ideally should be conducted in realistic settings, such as restaurants in which mandatory nutrition labeling has been implemented. None of the studies examined specifically the effects of nutrition labeling on food purchased for children. Viewed in the context of this meta-analysis, our data suggest that menu labeling effects on parental decision-making may differ depending on whether the parents are ordering for themselves or their children. In addition, it is possible that the demographic group of parents in our study sample made healthier choices at baseline and the labeling did not have much of an impact. For example, a study in New York City found that the average energy value ordered by adults for lunch at hamburger chains was 857 cal, with 39% making purchases of >1000 cal.[20] The mean values ordered by adults in both arms of our study were ~760 cal, that is, ~100 cal less than the mean in the aforementioned study.[20]

Our study has some other limitations that warrant consideration. First, it was not conducted in a real restaurant setting. Food choices are made within social and environmental contexts, and the results from a mock menu survey in a clinic setting might not fully represent that reality. However, the simplicity of the design and its anonymity might have promoted honest responses. Furthermore, the ideal design of a randomized experiment in real restaurant settings would be extraordinarily difficult to execute and might never be performed. Second, our BMI measurements were based on self-reported values and might lack external validity. However, because our study used a randomized design, this should not have biased our findings. Finally, our convenience sample might not represent accurately the effects of such an intervention on other populations of parents. Additional research is needed to explore the extent to which our findings can be generalized.

Despite these limitations, our findings have some important implications. Nutrition labeling may positively affect parents' food selections for their children if the labels are visible at the time of ordering. A growing number of local and state jurisdictions have introduced, passed, or implemented restaurant menu labeling regulations. Federal menu labeling standards have been introduced in both the House of Representatives and the Senate and were included in the recent health reform legislation. As various jurisdictions consider and enact menu labeling laws, additional research is needed to understand the impact of this public health regulation as a strategy to improve consumer awareness and to curb the obesity epidemic.

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