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Use of Food Labels, Awareness of Nutritional Programs and Participation in the Special Supplemental Program for Women, Infants and Children (WIC): Results from the National Health and Nutrition Examination Survey (2005-6)

Janet M Wojcicki, PhD MPH and Melvin B. Heyman, MD MPH

Pediatric Gastroenterology, Hepatology and Nutrition, University of California, San Francisco

Abstract

Background—Use of nutritional labels in choosing food is associated with healthier eating habits including lower fat intake. Current public health efforts have focused on the revamping of nutritional labels to make them easier to read and use for the consumer.

Objectives—To assess the frequency of use of nutritional labels and awareness of the United States Department of Agriculture (USDA) nutritional programs by women eligible and participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) as surveyed in the National Health and Nutrition Examination Survey (NHANES) 2005-6 .

Results—Many low-income women do not regularly use the nutrition facts panel information on the food label and less than half had heard of the United States Department of Agriculture's (USDA) Dietary Guidelines for Americans (38.9%). In multivariate logistic regression, we found that WIC participation was associated with reduced use of the nutrition facts panel in choosing food products (OR 0.45, 95%CI 0.22-0.91), the health claims information (OR 0.54, 95%CI 0.32-0.28) and the information on carbohydrates when deciding to buy a product (OR 0.44, 95%CI 0.20-0.97) in comparison with WIC eligible non-participants.

Conclusions—Any intervention to improve use of nutritional labels and knowledge of the USDA's nutritional programs needs to target low-income women, including WIC participants. Future studies should evaluate possible reasons for the low use of nutrition labels among WIC participants.

Background

Nutritional Labels in the United States

The introduction of uniform nutrition labels in the United States in 1994 was part of the Nutrition Labeling and Education Act (NLEA). The proposed benefits of providing

Address for correspondence: Janet M Wojcicki, PhD MPH, wojcickij@peds.ucsf.edu.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

JMW conceived of the idea for the study, did the analysis and wrote up the manuscript and MBH conceived of the study and assisted with the writing of the manuscript

increased nutritional information to consumers included the possibility that increased knowledge about the nutrition and fat content of food would be associated with a healthier overall dietary intake in adults and children. Previous studies with adults have found that increased label use is associated with lower fat intake (Neuhouser et al., 1999). The use of food labels has also been associated with fat reduction efforts in adults trying to make healthful dietary changes (Kristal et al., 1998) and the total percentage of calories from fat has been associated with reading nutrition labels (Huang et al., 2004). Recent data also suggest that the use of the nutrition facts panel has increased in recent years (from 32% in 2004 to 52% in 2008) (US Health and Human Services, Food and Drug Administration 2010).

Despite the proposed positive association between reading nutrition labels and increased health benefits, there have been few studies that have assessed the frequency of label use, particularly in at risk populations such as lower income communities that are at highest risk for obesity (Singh et al., 2010; Wang et al., 2007). Those studies that have been conducted have had disparate results, sample sizes have been small or they have not been population-based. One study conducted among lower socioeconomic status, African-Americans in North Carolina found that approximately 80% sometimes/always read nutritional labels (Satia et al., 2005) while another study with adults in food assistance program found that approximately one third read food labels (Perez-Escamilla et al., 2010). A study of the use of nutritional labels by low-income women in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in California, Ohio, Texas and Connecticut found a low percentage regularly use food labels. Only 19.7% stated that they use them often or quite often although a much higher 92.0% recognized the food label (McArthur et al., 2001).

In particular, studies need to be conducted that assess the relationship between participation in WIC and nutritional behavior such as label reading prior to purchase. WIC provides nutritional education (in addition to supplemental nutrition) to at-risk women and children, which ideally increases disadvantaged women's abilities to buy healthy and nutritious foods for themselves and their children. WIC educational programs have been successful in improving healthy eating among participants including changing the consumption of key targeted foods (Ritchie et al., 2010). The nutrition education forms a core part of the WIC program (Ritchie et al., 2010). However, WIC participants have not always been satisfied with the nutrition education that they receive (Nestor et al., 2001). As each WIC state and county offices provides different nutrition educational components with many different nutrition areas targeted, it is possible that some women never receive nutrition label specific educational trainings and others receive more intensive ones. As examples of nutrition label specific educational sessions, the state of Missouri has an on-line training for WIC participants entitled, "Food Label Basics" (Missouri Department of Health and Senior Services, 2011). The county of Riverside in California provides a "rethink your drink" training program which helps participants read drink nutrition labels and assess the amount of sugar in different drinks (County of Riverside, 2011).

In the last couple years, there has also been renewed interest in re-formatting the nutritional information on food and drink labels to make them easier to read and comprehend through federal policy initiatives (Barnes, 2010). Additionally, there are

ongoing efforts to place nutritional labels in restaurants as advocated by state and local health policymakers (Pomeranz, 2011). The White House Task Force on Obesity Prevention states that one of the benchmarks for success for the nutritional labeling in the US is “An increase in the number of parents who are better able to notice, understand, and use food labels” (Barnes, 2010). The Institute of Medicine (IOM) is currently conducting an investigation and will issue a report on front of package food labeling and the food industry has also proposed changes to the food labeling system suggesting the likely possibility of imminent changes to the food labeling system (Brownwell, 2011).

Awareness of Federal Nutrition Programs

Similarly, there have been recent changes to some of the US federal nutrition programs including the Food Guide Pyramid has been replaced by MyPlate in 2011, the government’s primary food group symbol (USDA-NAL 2011a; USDA-NAL 2011b). The Obama administration has suggested that the United States Department of Agriculture (USDA) needs to communicate more “effective, actionable messages” for its programs including the Dietary Guidelines for Americans and the Food Guide Pyramid, which could assist in changing behavior, and possibly address the obesity epidemic (Barnes, 2010). Past studies have shown that knowledge of the US Department of Health and Human Services (HHS) and the USDA Dietary Guidelines for Americans (USDA, 2011) and other educational programs such as USDA’s Food Guide Pyramid has been associated with healthier eating behavior including an increased likelihood of meeting requirements for fruit, dairy and protein (Kolodinsky et al., 2007).

The Dietary Guidelines for Americans provides dietary recommendations and was compiled by the USDA and HHS in 2010 (US Department of Health and Human Services, 2010b). The USDA also designed the Food Guide Pyramid, which outlines a plan for daily food choices using the Dietary Guidelines for Americans and was recently changed to My Plate (USDA, 2011b). Another federal nutrition program is the 5-A-Day for Better Health Program, renamed the Fruits and Veggie-More Matters (developed by the National Cancer Institute in collaboration with the Produce for Better Health Foundation and managed by the Center for Disease Control (CDC) since 2005), which was designed to encourage fruit and vegetable consumption (CDC, 2011).

In this study, we sought to assess the frequency of use of nutritional package information and awareness of nutritional programs by low-income women in the United States and whether participation in the WIC program was associated with differences in use and awareness in comparison with eligible non-participants (those women and girls who are eligible for participation based on criteria described below in the methods section but do not participate in the WIC program).

Methods

In 2005-6, the National Health and Nutrition Examination Survey (NHANES), a nationally based nutrition and health survey, added specific questions to assess diet behavior and nutritional awareness including questions on the use of food nutrition labels. Specifically, adolescents older than 15 years and adults were asked questions on diet behavior including

questions on the frequency of use of the nutrition facts panel, the ingredient list, serving size information, health claims, and then whether they check calories on a food product or calories from fat, calories from total fat, trans fat, saturated fat, cholesterol, sodium, carbohydrates, fiber and sugars. Respondents could answer that they use the information or check the nutrient always, most of the time, sometimes, rarely or never. Specifically, participants were shown a nutrition facts panel and then asked, “How often do you use the nutrition facts panel (or another part of the nutrition label based on the line of questioning) when deciding to buy a food product? Would you say always, most of the time, some of the time, rarely or never?” Participants were subsequently asked, “When you use the food label to decide about a food product, how often do you look for information about calories (or saturated fats, fats or cholesterol, etc.). Would you say always, most of the time, sometimes, rarely or never?”

Survey respondents were only asked additional questions about nutrition information use (e.g. if they check calories on a food product or check other nutrient information on the product) if they responded affirmatively that used the nutrition facts panel, the ingredient list, serving size information or health claims on a package. Questioning on nutrition information use was terminated if survey participants responded that they never use nutrition information on the health package.

Additionally, questions on nutritional awareness of USDA programs were assessed including awareness of Dietary Guidelines for Americans, My Pyramid and the Center for Disease Control’s 5-a-Day For Better Health Program. Respondent could answer either yes or no whether they had heard of certain programs or not. The specific questions were, “Have you heard of dietary guidelines? Have you heard of food guide pyramid? Have you heard about 5-a-day program?”

Statistical Analyses

Statistical analyses included means, standard deviations and percentages for univariate analyses, chi-square, t-tests of significance and multivariate logistic regressions for multivariate analyses. Ninety-five percent confidence intervals were provided for percentage estimates for total frequencies, as to provide information on the precision of the estimate. Bivariate results that were significant at $p < 0.05$ were further analyzed in multivariate models. Multivariate models were adjusted for age, WIC participation status, race/ethnicity, education level, poverty to income ratio and maternal body mass index (BMI) category. The primary outcome of interest was awareness of nutritional programs (yes or no) and use of nutrition label information (defined as using sometimes, most of the time or always) from the nutrition facts panel, ingredient list, serving or specific nutrient information (e.g. calories, calories from fat, saturated fats, trans fats, etc). We dichotomized use of nutrition label information into the above two categories based on the goal to understand predictors of frequent or occasional use in comparison with infrequent use. Our primary predictor of interest was participation in the WIC Program. All analyses adjusted for the complex survey design using NHANES supplied sampling weights and variance estimates for the years 2005-6. All statistical analyses were conducted using Stata 11.0.

We only included WIC eligible women and girls in our analyses as defined by those women and girls who were 185% at or below the federal poverty income level (a poverty income ratio = 1.85) (USDA-FNS, 2011). All women in the analysis met the low-income threshold as set by the WIC program. The poverty threshold is set by the US government and a poverty income ratio of 1.0 or below is defined as being in poverty (US Census Bureau, 2011). WIC eligible women must also either have a child under 5 years of age or be currently breastfeeding.

Ethical Review

This study received exempt approval from the University of California San Francisco's Committee on Human Research (CHR). The NHANES 2005-6 surveys also received approval from the National Center for Health Statistics Ethics Review Board (ERB) (Protocol # 2005-6) (National Center for Health Statistics, 2011).

Results

There were 643 pregnant women or women with children under the age of 5 (the population that WIC serves). Among the 643 women, there were 304 WIC eligible with 195 participating in the WIC program and 109 eligible but not participating. Using the weights provided by NHANES, this sample size corresponds to a population size of 6,193,613. The mean age of the group was 28.1 years (95%CI 27.1-29.1) (Table 1). Almost half (49.5%) were married and 69.6% were US-born with the majority living in poverty (53.2%) and 71.3% having a high school degree or less. The majority of the group was overweight (41.9%) with 23.7% being obese (Table 1). The frequencies of demographic and health characteristics were similar between WIC participants and eligible non-participants with the exception of maternal age, the percentage living in poverty and maternal education level. The mean maternal age among WIC participants was 29.5 years and 27.0 for eligible non-participants. A higher percentage of WIC participants were living in poverty (53.2% versus 44.9%) and a lower percentage had an educational level higher than a high school degree (22.7% with some college versus 36.8% of eligible non-participants) (Table 1). The frequency of white race was also higher among eligible non-participants (44.5% versus 33.4%) although the differences in race/ethnicity breakdown were not statistically significant (Table 1).

For the questions on nutrition awareness, there was little statistically significant difference between WIC participants and non-participants although non-participants tended to have slightly higher awareness of all programs. Of note, while 75.2% of women had heard of the Food Pyramid program, only 36.6% had heard of the dietary guidelines and 47.7% had heard of the 5-a-day program (Table 2).

For the questions concerning dietary behaviors, WIC participants were less likely to use the nutrition facts panel on the food label (45.2% versus 68.7%, $p<0.01$) (Table 2). WIC participants were also much less likely to use the ingredient list on the food label (37.1% versus 51.7%, $p=0.02$) or much less likely to use health claims on the food label (39.7% versus 58.0%, $p<0.01$) (Table 2). WIC mothers were also less likely to check calories on the food label (50.1% versus 77.7%, $p=0.046$), check calories from fat (47.2% versus 70.4%,

p=0.02), check carbohydrates on the food label (42.4% versus 64.5%, p<0.01), check sugar (58.0% versus 77.3%, p=0.01) and check sodium on the food label (46.7% versus 66.0%, p=0.02) (Table 2).

Adjusting for race/ethnicity, education level, WIC participation status, maternal age at interview, poverty to income ratio and maternal body mass index (BMI) category in multivariate regressions, WIC mothers were less likely to use the nutrition facts panel OR 0.45 (95%CI 0.22-0.91), use the health claims on a package when deciding to buy a food product (OR 0.54, 95%CI 0.32-0.92), and check calories from carbohydrates (OR 0.44, 95%CI 0.22-0.97) (Tables 3-4). Higher maternal age was also associated with greater likelihood to check calories from fat (OR 1.06, 95%CI 1.01-1.12) (Table 4) and women with an educational level of high school or less were less likely to check carbohydrates (OR 0.29, 95%CI 0.15-0.56) and sodium (OR 0.30, 95%CI 0.14-0.66) (Table 4-5).

Discussion

We found important differences in the use of the nutritional facts panel information and other product nutritional information by WIC participants in comparison with eligible non-WIC participants even after adjusting for race/ethnicity, poverty to income ratio, educational level, maternal age and BMI category. We did not find any statistically significant differences in the awareness of nutrition programs based on WIC participation status for the Dietary Guidelines, the Food Pyramid and 5-a-Day Programs.

For the overall group of WIC eligible women, we found that near half regularly (always, most of the time or sometimes) make use of the nutritional facts panel information (55.1%) with a slightly lower percentage using the ingredient list (43.3%) or the serving size on the food label (44.4%). The relatively low use of nutritional labels is concerning in this population group given the high risk for obesity and should be taken into consideration given ongoing efforts to revamp nutritional labels and potentially place them on the front of packages or in a manner that is easier to read and understand by the consumer (Brownwell et al., 2011). The differences that we also found between WIC participants and non-participants are additionally disconcerting given the nutritional educational component of the WIC program and federal funds spent in this area. Specifically, the more limited use of the nutritional facts panel and the ingredient list by WIC participants in comparison with the eligible non-participants should be investigated in future studies quantitative and qualitative studies.

As not all food items can be purchased under the WIC program, it is possible that participants develop a routine where they only purchase certain items. As the routine develops and participants select only certain items, they may no longer look at nutrition facts panel or other nutrition label information and develop complacency when shopping. If this is the pattern of purchase for WIC participants, then future interventions should target these types of behaviors, which ultimately will not serve the WIC population. As WIC is a supplemental food program, it is not meant to satisfy all the nutritional needs of participants, and participants still need to make food purchasing choices. Additionally, within the WIC food package, there are a variety of options available to participants, and ideally they should

be evaluating the nutritional content of different food items. Future studies need to be conducted to verify the possibility that WIC participants stop reading nutrition labels when they make WIC-supported purchases and/or other food purchases.

We also had a relatively low percentage of women surveyed who had heard of the USDA Dietary Guidelines (38.9%) and the CDC's 5-a-Day program (48.4%). A higher percentage had heard of the Food Pyramid (79.76%), but this was lower than the 92.2% of WIC participants who were aware of the Food Pyramid in the study by Perez-Escamilla (2010) (Perez-Escamilla et al., 2010). Our results also differed from those by Perez-Escamilla (2010) (Perez-Escamilla et al., 2010) in the frequency of food label use; they had a much higher percentage of WIC participants (19.7%) who stated that they often or quite often use food labels and 80.3% saying they only rarely or sometimes use them. The differences in results could be explained by the differences in population surveyed. In contrast with our study which was drawn from a population based survey, the study by Perez-Escamilla (2010) (Perez-Escamilla et al., 2010) was based on an exclusively Latina sample and was drawn from populations in Connecticut, Ohio, Texas and California. Low income Latinas may have a higher use of nutrition information in comparison with other population groups captured by the NHANES.

Limitations

Our data analysis was based on data collected by NHANES in 2005-6, which is approximately 6 years ago from the time period of doing the analysis for this article. It is possible that there have been recent changes in public awareness of federal programs and nutrition label reading behaviors because of policy changes that have added labels to restaurants and on-going public discourse in the media concerning nutrition issues.^{26,27} These potential changes in awareness and behaviors would not have been picked up by the NHANES 2005-6.

Another limitation of our study is that while we adjusted for WIC participation status and income levels using the poverty to income ratio, statistical adjustment may have not fully accounted for differences between WIC participants and non-participants. There likely was selection bias in terms of unobservable differences between WIC participants and non-participants that drive enrollment in the WIC program that may not have been accounted for by the statistical methods used in this analysis. Previous researchers have suggested that the costs and benefits associated with enrolling in the WIC program are associated with significant maternal differences that could impact health outcomes and erroneously be associated with the WIC program (Ludwig et al., 2005; Gueorgieva et al., 2009). Meanwhile, the results of our study, which indicate significant differences between WIC participants and eligible non-participants in use of nutritional labels, should be the impetus for future studies to systematically investigate diet related behaviors and attitudes in low income women.

Future Directions

Future studies need to be conducted, specifically qualitative studies or focus groups to assess why WIC participants may be less inclined to use the information on the nutrition facts

panel. Previous reviews of the WIC program have cited its effectiveness in reducing the prevalence of iron deficiency anemia among toddlers and preschool children and a slightly higher birth weight and a higher mean gestational age among participants (Owen and Owen, 2009). The content of the educational component of the WIC program is something that varies by site, with each WIC state agency responsible for developing nutritional programs that comply with WIC's overarching aims (Missouri Department of Health and Senior Services, 2011; USDA Learning Center, 2011), which may make it difficult to assess comprehensively.

With the current administration's recommendation to revamp the nutritional labeling program, make the USDA's nutrition programs more accessible and the more widespread availability of nutrition labeling in restaurants and fast food locations (Elbel, 2011) studies need to be conducted to assess the impact of these changes on WIC women, a high risk group, in addition to low-income women in general. If women in WIC program tend to use nutrition labels less, in spite of additional educational counseling on reading nutrition labels, because their purchases are limited to WIC purchases with WIC dollars, additional studies are needed to assess whether these behaviors translate into additional food purchases.

We also suggest that further larger-scale studies be conducted to investigate possible differences found in this study between WIC participants and eligible non-participants. Future studies should use statistical techniques that include the use of instrumental variables (Bitler et al., 2005) or other techniques such as propensity function methods to control for selection bias in the enrollment in the WIC program (Gueorguieva et al., 2009). The current sample size was too small to include an instrumental variable or to use other methods and could have resulted in additional statistical adjustments to the study (Martens et al., 2006).

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Table 1
Socio-demographics of WIC Participants and WIC Eligible Non-Participant Mothers in the National Health and Nutrition Examination Survey 2005-6 (n=305)

Variable	Total Mean or % (95% CI)	WIC Only Mean or %	Non-WIC Mean or %	P Value
Age	28.1 (27.1-29.1)	29.5	27.0	<0.01
Race/Ethnicity				
Mexican American	26.2 (18.8-35.2)	30.1	20.9	0.70
Other Hispanic	8.1 (4.8-13.2)	8.8	7.1	
White	38.1 (27.3-50.2)	33.4	44.5	
Black	22.0 (13.5-33.6)	23.1	20.5	
Other Race	5.7 (2.4-12.9)	4.7	7.1	
Marital Status				
Married	49.5 (41.8-57.2)	41.2	60.8	0.1
Living with Partner	16.9 (12.0-23.3)	19.8	13.0	
Never Married	24.9 (17.6-34.1)	29.3	19.0	
Divorced	4.2 (2.8-6.3)	5.6	2.4	
Separated	4.4 (2.0-9.5)	4.1	4.8	
US Born	69.6 (58.2-79.0)	68.4	71.2	0.48
Living in Poverty (PIR <1.3)	53.2 (44.5-61.8)	59.3	44.9	0.03
Education Level				
College (any)	28.7 (20.5-38.5)	22.7	36.8	0.03
High School degree or fewer years	71.3 (61.5-79.5)	77.3	63.2	
Maternal BMI Category				
Normal (<25)	34.4 (27.3-42.3)	37.7	29.9	.68
Overweight 25 & <30	41.9 (34.8-49.4)	22.3	25.5	
Obese 30	23.7 (18.7-29.6)	40.0	44.6	
Participating in WIC Program	57.7 (48.2-66.6)			

Table 2
Nutrition Awareness and Behaviors by WIC Participation Status (n=305)

<u>Variable</u>	<u>All women*</u>	<u>WIC</u> <u>%</u>	<u>non-WIC</u> <u>(N/total) %</u>	<u>P Value</u>
<i>Nutrition Awareness</i>				
Heard of Dietary Guidelines	38.9 (31.1-47.4)	36.6	42.2	0.36
Heard of Food Pyramid	79.7 (69.9-86.8)	75.2	85.8	0.34
Heard of 5-a-day Health Program	48.4 (41.6-55.2)	47.7	49.4	0.42
<i>Diet Behaviors</i>				
Use Nutrition Facts Panel on Food Label	55.1 (45.0-64.8)	45.2	68.7	<0.01
Use Ingredient List on Food Label	43.3 (34.4-52.6)	37.1	51.7	0.02
Use Serving Size on Food Label	44.5(36.9-52.4)	40.5	50.0	0.28
Use Health Claims on Food Packages	47.5 (37.2-58.0)	39.7	58.0	<0.01
Check Calories on Food Label	63.0 (55.8-69.6)	50.1	77.7	0.046
Check Calories from Fat on Food Label	58.0(49.0-66.5)	47.2	70.4	0.02
Check Total Fat on Food Label	58.3 (49.6-66.5)	52.2	65.2	0.12
Check Trans Fat on Food Label	43.8 (35.2-52.7)	36.1	52.6	0.10
Check Cholesterol on Food Label	48.6 (39.2-58.2)	48.0	49.4	0.88
Check Saturated Fat on Food Label	51.2 (43.4-58.9)	44.0	59.4	0.058
Check Carbohydrates on Food Label	52.7 (45.2-60.0)	42.4	64.5	0.02
Check Fiber on Food Label	55.4 (48.2-62.3)	49.7	61.8	0.18
Check Sugar on Food Label	66.9 (58.2-74.7)	58.0	77.3	0.01
Check Sodium on Food Label	55.7 (47.0-64.0)	46.7	66.0	0.02

* All WIC-eligible women. This includes participating and eligible non-participating women.

Table 3
Use of Nutrition Facts Panel, Ingredient List and Health Claims on a Package when
Deciding to Buy a Food Product: Results of Multivariate Analysis

Variable	Nutrition Fact Panel Odds Ratio (95% CI)	Ingredient List Odds Ratio (95%CI)	Health Claims Odds Ratio (95% CI)
Race/Ethnicity			
Mexican-American	1.00	1.00	1.00
Other Hispanic	1.71 (0.49-6.00)	1.94 (0.46-8.18)	0.91 (0.13-6.45)
White	0.88 (0.33-2.38)	1.27 (0.62-2.61)	1.38 (0.67-2.84)
African-American	1.05 (0.36-3.03)	0.89 (0.34-2.32)	0.94 (0.34-2.54)
Other Race	0.40 (0.10-1.70)	3.86 (1.58-9.42)	4.12 (0.54-31.32)
Education			
Some college or more	1.00	1.00	1.00
High school or less	0.45 (0.18-1.12)	1.92 (0.78-4.76)	0.60 (0.27-1.33)
Socioeconomics			
WIC participation	0.45 (0.22-0.91)	0.58 (0.32-1.07)	0.54 (0.32-0.92)
Age at interview	1.02 (0.96-1.08)	1.04 (0.99-1.11)	1.03 (0.97-1.09)
Maternal BMI Category			
Normal	1.00	1.00	1.00
Overweight	1.57 (0.58 -4.29)	1.11 (0.44-2.78)	0.91 (0.44-1.86)
Obese	1.16 (0.53-2.52)	0.82 (0.45-1.49)	1.22 (0.57-2.61)
Poverty Income Ratio	1.16 (0.65-2.04)	1.23 (0.57-2.64)	0.81 (0.44-1.48)

Table 4
Use of Calories from Fat, Total Calories and Carbohydrates on Food Label when
Deciding to Buy a Food Product: Results of Multivariate Analysis

Variable	Calories from Fat Odds Ratio (95% CI)	Total Calories Odds Ratio (95% CI)	Carbohydrates Odds Ratio (95% CI)
Race/Ethnicity			
Mexican-American	1.00	1.00	1.00
Other Hispanic	4.31 (0.89-20.83)	2.93 (0.74-11.64)	1.71 (0.49-6.00)
White	0.58 (0.20-1.69)	0.80 (0.32-2.00)	0.88 (0.33-2.38)
African-American	0.81 (0.22-3.03)	0.50 (0.15-1.67)	1.05 (0.36-3.03)
Other Race	2.62 (0.45-15.29)	2.06 (0.35-12.18)	0.40 (0.10-1.70)
Education			
Some college or more	1.00	1.00	1.00
High school or less	0.98 (0.34-2.81)	0.88 (0.40-1.92)	0.29 (0.15-0.56)
Socioeconomics			
WIC participation	0.35 (0.19-1.01)	0.29 (0.07-1.12)	0.44 (0.20-0.97)
Poverty income ratio	0.68 (0.34-1.36)	0.68 (0.31-1.49)	0.87 (0.49-1.55)
Age at interview	1.06 (1.01-1.12)	1.04 (0.97-1.12)	1.03 (0.97-1.09)
Maternal BMI Category			
Normal	1.00	1.00	1.00
Overweight	0.62 (0.19-2.03)	1.18 (0.23-6.17)	1.96 (0.62-6.17)
Obese	1.47 (0.50-4.35)	1.89 (0.76-4.67)	1.42 (0.67-3.00)

Table 5
Use of Sugar and Sodium on Nutrition Label When Deciding to Buy a Food Product:
Results of Multivariate Analysis

Variable	Sugar Odds Ratio (95% CI)	Sodium Odds Ratio (95% CI)
Race/Ethnicity		
Mexican-American	1.00	1.00
Other Hispanic	0.73 (0.19-2.88)	1.89 (0.46-7.67)
White	1.27 (0.55-2.95)	1.06 (0.41-2.73)
African-American	0.72 (0.34-1.51)	1.22 (0.43-3.50)
Other Race	0.54 (0.13-2.19)	2.24 (0.12-40.78)
Education		
Some college or more	1.00	1.00
High school or less	0.41 (0.11-1.56)	0.30 (0.14-0.66)
Socioeconomics		
Eligible non-participants	1.00	1.00
WIC participation	0.51 (0.20-1.29)	0.54 (0.25-1.15)
Maternal Age at interview	1.03 (0.97-1.10)	1.05 (0.97-1.13)
Maternal Body Mass Index		
Normal	1.00	1.00
Overweight	1.43 (0.53-3.83)	1.75 (0.46-6.70)
Obese	1.11 (0.40-3.07)	1.27 (0.44-3.64)
Poverty income ratio	1.47 (0.65-3.33)	0.98 (0.48-2.02)