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NUTRITION KNOWLEDGE OF CONSUMERS AND HEALTH PROFESSIONALS
AND THE USE OF MENU CALORIE LABELING

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Sciences
College of Agriculture
at the University of Kentucky

By

Kate Louise Perkins

Lexington, KY

Director: Kwaku Addo, PhD, Associate Professor of Nutrition and Food Science

Lexington, Kentucky

2011

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ABSTRACT OF THESIS

NUTRITION KNOWLEDGE OF CONSUMERS AND HEALTH PROFESSIONALS AND THE USE OF MENU CALORIE LABELING

The purpose of this study is to assess the need for menu labeling of calories based on the ability of food consumers to identify lower calorie options. By surveying consumers in Kentucky and Ohio and health professionals in Kentucky about their awareness of caloric content, basic nutrition knowledge and ability to choose lower calorie options, we can predict the potential benefit of menu labeling initiatives and the amount of education that will be necessary for consumers to effectively use menu labeling to make informed decisions on calorie intake. Through online surveys, it was determined that consumers were better able to predict calorie levels of foods at common quick serve restaurants, compared to health professionals. Health professionals are more knowledgeable about daily calorie requirements and more likely to change their quick serve food order with calorie labels. Health professionals and consumers dining out 3-5 times per month were better able to determine low calorie options and daily calorie requirements. These findings suggest that show that health professionals are in no better able to predict calorie levels at restaurants. Furthermore, nutrition education is necessary to aid in the use of menu calorie labeling for consumers.

KEYWORDS: Menu labeling, Calorie labeling, Consumers, Health professionals, quick serve

Kate Louise Perkins

August 2, 2012

NUTRITION KNOWLEDGE OF CONSUMERS AND HEALTH
PROFESSIONALS AND THE USE OF MENU CALORIE LABELING

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CHAPTER ONE

Introduction

Background

Each year, Americans consume fewer calories at home and more calories at chain restaurants, either quick serve (fast food), or sit down service. Many factors affect this increase in calories eaten away from home including busy lifestyles, convenience, and social experiences. In 2011, about half of all food dollars were spent at restaurants, mostly for quick serve meals (National Restaurant Association, 2011). Other factors affecting this increase in calories away from home may include limited cooking skills, lack of convenient access to grocery stores, lack of proper kitchen equipment or clean water and electricity. This increase in dining out has coincided with an increase in obesity and obesity related health risks in the U.S. Overweight is defined as excess body weight (from fat, muscle, bone, water or all of the above) while obesity is defined as having excess body fat (Center for Disease Control, 2011a). About two thirds of individuals in the U.S. are considered overweight or obese. Obesity levels in Kentucky are at 31.3% and Ohio is slightly lower at 29.2% (Center for Disease Control, 2011b). One possible avenue for preventing or reversing obesity is through increasing consumer knowledge of calories eaten while away from home. Thousands of people each year are affected by heart disease and diet-related illnesses.

Statement of the Purpose

The purpose of this study was to assess the need for menu labeling of calories based on the ability of food consumers to identify lower calorie options. By surveying

consumers in both Kentucky and Ohio, and health professionals in Kentucky about their awareness of calorie content, basic nutrition knowledge and ability to choose lower calories options, we can predict the potential benefit of menu labeling initiatives and the amount of education that will be necessary for consumers to effectively use menu labeling to make informed decisions on caloric intake.

Research Questions

1. Can health professionals and consumers correctly identify the lowest calorie option from commonly available quick serve items of sandwiches, pizza and side dishes?
2. Is there a relationship between frequency of quick serve consumption and the ability to identify lower calorie options at quick serve restaurants?
3. Is there a relationship between correctly identifying daily calories requirements and the ability to identify lower calorie options from quick serve restaurants?
4. Is there a relationship between frequency of quick serve food consumption and the ability to correctly identify daily calorie requirements?
5. Will consumers alter their choice of pizza if calorie information is readily available on the menu?
6. What are the differences between health professionals and consumers regarding frequency of quick serve consumption, altering quick serve orders with calorie information and correctly identifying low calorie options?

Justification

The population of overweight and obese individuals in Kentucky exceeds the national average of 62.8% at 67.7%, while Ohio is also just over the national average at 65.0% (Henry J. Kaiser Family Foundation, 2010). In order for consumers to make sound nutritional decisions when dining out, calorie information must be provided and properly understood (Kuo, Jarosz, Simon, & Fielding, 2009). According to a statement from the Academy of Nutrition and Dietetics nutrient data alone—without complementary nutrition education as well as how to use the information—will not be enough to combat obesity (Stein, 2010a). Future research should determine how to best communicate calorie information to food consumers to allow informed choices when eating away from home.

Assumptions

The following assumptions were made: The survey population is familiar with menu items at Kentucky Fried Chicken, McDonalds, and Pizza Hut. Secondly, the subjects are assumed to have answered truthfully. Finally, it was assumed that subjects would not research answers online as the survey was being completed.

CHAPTER TWO

Literature Review

Obesity and Consumers

Obesity is a growing problem in the United States, especially in southern states, such as Kentucky (Center for Disease Control, 2011b). Specific groups are at higher risk for obesity, such as African Americans, Hispanics, as well as those with low-income and less education (Drewnowski & Specter, 2004). Obesity presents a significant financial burden to the public. Overweight and obese adults and children have an increased likelihood of suffering from heart disease, type 2 diabetes, high blood pressure, cancers, and other chronic conditions (Wilbur, 2011). The estimated costs associated with obesity were \$117 billion in 2003 for Americans with \$61 billion in direct costs and \$56 billion in indirect costs (Finkelstein, Fiebelkorn, & Wang, 2003).

More people are eating at quick serve restaurants and more quick serve restaurants are being built each year than ever before (Friedman, 2008). Currently the restaurant industry garners 49% of food dollars. This figure was 25% in 1955 (National Restaurant Association, 2011) which is an increase of 24% over 56 years. One in every four Americans will stop at a quick serve restaurant daily (Wilbur, 2011). The media has a large influence on what food choices are made in the United States. Eleven billion dollars was spent on advertising for food and beverage products and restaurants in 2004 (Stein, 2010a).

Larger portion sizes at restaurants prompt people to consume more calories when eating out compared to when eating at home (Friedman, 2008). In 2006, Americans consumed seven hundred calories more per capita per day than they did in the 1970's

(U.S. Census Bureau, 2011). One study based on self-reported dietary intakes of the US population found that between the years of 1977 and 1996, portion sizes increased significantly (P-values <0.01). (Nielsen & Popkin, 2003). The standard serving size of salty snacks increased by 93 calories, soft drinks by 49 calories, hamburgers by 97 calories, French fries by 68 calories, and Mexican dishes by 133 calories (Nielsen & Popkin, 2003). These additional calories consumed away from home amount to 205 additional calories per day for adults and 155 calories per day for children (Paeratakul, Ferdinand, Champagne, Ryan, & Bray, 2003). Policy and government regulations may enable consumers to reduce portion sizes, as voluntary efforts by restaurants are unlikely to be implemented, or to be effective (Young & Nestle, 2007). Restaurant marketing strategies include pricing larger portions only slightly higher than smaller portions, thus encouraging consumers to select the better value (O'Dougherty et al., 2006). This has been reported to persuade consumers that larger portions are the norm. However, consumers must consider meals in relation to their total diet (Stein, 2010a, 2010b).

Extra calories consumed while eating away from home contribute to excess energy intake (French, Harnack, & Jeffery, 2000; St-Onge, Keller, & Heymsfield, 2003). If an adult eats away from home around three times per week, the additional 205 kcals likely to be consumed would result in a weight gain of 9-10 pounds per year. Eating more calories away from home is associated with weight gain (Duffey, Gordon-Larsen, Jacobs, Williams, & Popkin, 2007; Niemeier, Raynor, Lloyd-Richardson, Rogers, & Wing, 2006; Pereira et al., 2005; Satia, Galanko, & Siega-Riz, 2004; Thompson et al., 2003) and frequency of quick serve consumption increases the likelihood of being overweight or obesity by 27-31% (Bowman & Vinyard, 2004).

Several studies have found that people underestimate the amount of calories in menu items while also overestimating the healthiness of the items (Chandon & Wansink, 2007; Wansink & Chandon, 2006; Young & Nestle, 2007). Restaurants commonly use more butter, oil, salt and other ingredients than would normally be used at home, to increase the flavor of the food (Winkles, 2009). One study found that 9 out of 10 people underestimate the number of calories in restaurant meals by more than 600 calories (Burton, Creyer, Kees, & Huggins, 2006), while a Washington D.C. poll found that experienced health professionals (dietitians) underestimated the number of calories in restaurants by 200-600 calories. The study concluded that if dietitians severely underestimate the amount of calories and fat in restaurant items, then there is little hope for consumers being able to “accurately assess the impact of restaurant foods on their diet” (Backstrand, Wootan, Young, & Hurley, 1997). Despite this problem among the well informed consumer, access to nutrition information is an important step for anyone to make wiser food choices.

Nutrition Legislation

Access to nutrition information about food choices is necessary for maintaining a healthy lifestyle. A major milestone toward informing consumers was the enactment of the National Labeling and Education Act (NLEA), signed into law on November 8, 1990 by George H. W. Bush. The law requires food manufactures to state the standard serving size, number of calories, and the percent daily values of vitamins A and C, iron, calcium as well as the content of fat (saturated and unsaturated), cholesterol, sodium, sugar, fiber, and protein for packaged food sold in retail stores; however, the legislation did not include restaurants. The NLEA also established definitions for the descriptions such as

“low-fat”, “low-calorie”, “reduced”, “lean” and “light,” and set standards for health claims to be based on accurate and sound scientific evidence and not misleading in any way (Wilbur, 2011). In 1993 the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA) released their identical regulations on the content of the food labels and the format of the nutrition food label to ensure that consumers can accurately compare items. In 2006, trans-fatty acids were added to the requirements for a nutrition facts label.

New York City was the first city in the United States to implement menu labeling in December of 2006. By July 2008, all restaurants in New York City were required to display calories at the point of purchase on standard menu items. In 2008, California also enacted menu labeling legislation. On January 1, 2011, California became the first state to enact menu labeling on menus or in food cases for restaurant chains with over 20 locations. Other states with bills and laws in progress are Maine, Massachusetts and Oregon, which enacted menu labeling legislation in 2009. New Jersey and Tennessee enacted legislation in 2010. Kentucky proposed a bill in 2008 that would have created rules similar to New York City, but the bill did not pass.

Most recently, President Barack Obama signed the Patient Protection and Affordable Health Care Act on March 23, 2010. Part of this law establishes the nutrition labeling of standard menu items (offered at least 60 days of the year) at chain restaurants and vending machine operators with 20 or more locations (Stein, 2010a). Calorie information must be posted in a “clear and conspicuous manner” with other nutritional information about the product, as well as general nutrition information available on request. This law allows the consumer to actively participate in making informed

choices. One study found that in restaurant chains with publically available nutrition information, not posted on the menu, only 5% of patrons saw the information (Bassett et al., 2008). Another study found that 0.1% of restaurant patrons access nutrition information when it is provided in less accessible ways, such as online or in a brochure (Roberto, Agnew, & Brownell, 2009). These studies suggest that it is essential for calorie information to be listed on the menu in order to increase the likelihood that consumers will see and use the information. Environmental circumstances, along with individual behavior, have a strong effect on decisions people make on a daily basis.

Social Ecological Model

The Social Ecological Model (SEM) provides a framework for illustrating the impact and interdependence of the larger environment on individual behavior (U.S. Department of Health and Human Services, 2005). The SEM includes five levels of behavioral influence in our society: intrapersonal level (individual knowledge, attitudes and beliefs), interpersonal level (friends, family and peers), institutional factors (rules regulations, policies and informal structures), community factors (formal or informal social norms), and public policy (local, state and federal policies and laws). To work on the intrapersonal level means to influence the “behavior, knowledge, attitudes, beliefs and personal traits” of an individual (U.S. Department of Health and Human Services, 2005). Change at each level is necessary to bring about behavior change in an individual.

Changing an individual’s knowledge and attitudes may facilitate behavior change. However, other factors are for the person to feel wanted and accepted by their family, friends, peers, local institutions, and community. Following these norms is very important to some people, and is a key influence in their behavior choices. People often

act the way in which they want others to perceive them. Finally, public policy controls the environment on a wider scale. Without a change in public policy, rules and regulations may not support healthy behaviors. Without policy change, consumers will not have the opportunity to make healthy choices.

Impact on Consumers

The impact of menu labeling on consumer choices could be substantial, empowering the customer to make healthy choices on a daily basis. Research of the impact of menu labeling on food choices is limited and confined in those regions that have implemented it. Several menu labeling studies have shown positive results.

Studies show that consumers support menu labeling and want this information to be readily available (Friedman, 2008). Three out of four American adults use food labels on packaged food and seven out of ten Americans believe that calorie information on menus would help them make informed decisions regarding their diet and healthy choices (U.S. Department of Health and Human Services, 2001). Forty eight percent of Americans reported that using nutrition food labels resulted in changes in food purchasing behaviors (Levy & Derby, 1996). According to a study in New York City, consumers purchased 52 fewer calories when menus were labeled, compared to menus not labeled (Bassett et al., 2008). Small reductions in calorie intake have the potential to make significant difference in calorie intake and reduce the average annual weight gain of Americans (Kuo et al., 2009).

However, it has been noted that those most likely to utilize nutrition information are those who have specific health concerns, those who are generally health conscious, parents shopping for children and individuals who are currently dieting (Stein, 2010a).

Another potential health benefit of menu labeling is that quick serve and chain restaurants may be encouraged to change the nutritional content of their meals (Friedman, 2008). To maintain a reputation as a consumer focused restaurant and remain competitive, restaurants may join the calorie labeling movement, just as processed food manufactures made changes in 2006 when trans fatty acids were added to the Nutrition Facts Panel. Many manufactures have reformulated products to contain less trans fatty acids since the mandate (Grocery Manufacturers of America, 2004). Panera Bread, a national chain, decided to voluntarily disclose calorie information on their menu boards in April 2010. Panera also “improved the nutritional content and ingredients served in their menu items” (Panera Bread: Press Release, 2010).

One concern that health professionals have with the implementation of menu labeling is the potential halo effect—people associate certain restaurants or foods as being “healthy” and tend to let their guard down when eating there or eating the particular food. The same is also true for calories with menu labeling adoption. If an item is low in calories, people might be led to believe that it is healthier, when in fact, this item may be high in sodium or artificial sugars (Lee, Shimizu, & Wansink, 2011). People are more prone to also purchase higher calorie side items, drinks or deserts when their main dish is advertised as healthy (Chandon & Wansink, 2007). The “health halo effect” may be a factor with the implementation of calorie menu labeling.

Another concern is the lack of consumer nutrition education. In a statement by the Academy of Nutrition and Dietetics, nutrient data alone—without complementary nutrition education as well as how to use the information—will not be enough to combat obesity (Stein, 2010a). However, only 64-73% of people reported accurate knowledge of daily calorie needs (Krukowski, Harvey-Berino, Kolodinsky, Narsana, & DeSisto, 2006). Serving size information is the cause of much confusion (Stein, 2010a). However, those who utilize the serving size information consume fewer calories. In one study, participants ate 150 kcal less per day when using this information (Ollberding, Wolf, & Contento, 2010).

Accuracy of menu labels is another concern. A study at Tufts University found that from 29 quick-serve restaurants that provided calorie information, the establishments under-reported calories by an average of 18% (Peregrin, 2011). This is a concern for those consumers who are looking for healthy options when they dine out. However, under the government regulations, calories levels must be within 20% of the correct value (Stein, 2010a). This poses a distinct issue for restaurants also.

Impact on Restaurants

Many organizations in the restaurant industry oppose the menu labeling initiative. One study found that barriers on menu labeling in restaurants include infrequent use of standardized recipes, business risk of labeling, low customer demand for nutrition information and cost of recipe analysis (Britt, Frandsen, Leng, Evans, & Pulos, 2011). Also, the current law exempts more than 75% of restaurants throughout the country (chains with fewer than 20 locations). Large companies feel that they are being singled

out, and are encouraging modification of the law to include small, local restaurants as well (Paul, 2009).

One study on the use of nutrition labels at a university food service location found that menu labeling implementation reduced the amount of calories purchased by patrons, but did not alter the number of meals sold, or the revenue from the cafeteria (Chu, Frongillo, Jones, & Kaye, 2009).

Many chain restaurants are already taking the initiative to provide calorie information for health conscious consumers. The Panera Bread company lists calories on the menu board and Starbucks list calories in the case next to the item. Menu labeling is being implemented at a time when many restaurants are already making nutritional changes and disclosing recipe information. Food allergies, Celiac disease and vegetarianism are a few of the reasons why chain restaurants such as Wendy's, Dunkin Donuts and P.F. Chang's are making changes and notifying consumers about ingredients (Hsu, 2011). Accommodating the needs of these consumers will encourage repeat customers.

Price of calorie analysis is a concern for many restaurant chains. In order to get accurate calories counts, expensive laboratory chemical analysis is necessary (Peregrin, 2011). Nutrition calculation software provides a reduced cost and ease, but may be less accurate.

Reduced sales are a concern for many restaurants. Bollinger et al. observed consumer purchasing patterns before and after menu labeling implementation in New York City at Starbucks. There was a 6% reduction in calories purchased after menu labeling implementation that lasted at least 10 months. Coffee sales remained

unchanged, high calorie food selection sales went down while low calorie food items increased in sales. There was no impact on profit (Bollinger, Leslie, & Sorensen, 2010). Other studies have studied the effects of menu labeling on consumer purchasing patterns.

Menu Labeling Studies

Several studies have analyzed the effects of menu labeling on consumer purchasing patterns in the U.S. One study divided subjects into three groups, one with no calorie labels, one with calorie labels and one with calorie labels plus a label stating the daily recommended caloric intake. The two groups with calories labels ordered significantly fewer calories than the group with no labels. The group with calorie labels and daily recommendations ordered 14% fewer calories than the no calorie label group (Roberto, Larsen, Agnew, Baik, & Brownell, 2010). However, there was no significant difference between the calorie labeled group and the calorie label plus daily recommendations group.

Menu labeling studies have been conducted in New York City since the legislation was implemented in 2008. One study conducted surveys at 15 of the largest quick serve chains in New York City three months before menu labeling implementation and three months after implementation. This study demonstrated that before implementation, 25% of the customers reported seeing calorie information compared to 64% after implementation (Dumanovsky, Huang, Bassett, & Silver, 2010). Twenty seven percent of people who saw the calorie information made use of it in their menu choices, in both the pre- and post- groups. However, there was no significant change in calories ordered.

A study that conducted pre- and post- menu labeling implementation compared adult quick serve purchases in the city and in a control city of Newark, NJ, which did not implement menu labeling. The results showed no significant differences in calories purchased before or after menu labeling implementation (Elbel, Kersh, Brescoll, & Dixon, 2009). Again, 27% of those who did see the information were influenced by it in their purchase. A companion study found that children and adolescents had no change in calories consumed before and after menu labeling implementation in New York City and Newark (Elbel, Gyamfi, & Kersh, 2011). Fifty seven percent of the sample in the study saw the nutrition information, but only 9% utilized it when ordering.

Another study found that 1/3 of adults in New York City could accurately assess adequate daily calorie requirements and this number did not change after menu implementation (Elbel, 2011). However, after menu labeling implementation the number of low-income families who could accurately estimate the amount of calories in their quick serve meal increased (15% pre labeling to 24% post labeling).

A study, on implementation of menu labeling in King County, WA found that no differences before and after calorie labels were in place at a quick serve Mexican chain (Finkelstein, Strombotne, Chan, & Krieger, 2011).

Harnack et al. found that there were no significant differences in participants' decisions after a 2x2 experiment with the variables calorie labels, no calorie labels, value pricing and no value pricing (Harnack et al., 2008). The study concluded that long term research should be done in order to determine the influence of repeated exposure to these factors.

CHAPTER THREE

Methodology

Research Methods

This study was approved by the University of Kentucky, Office of Research Integrity Institutional Review Board (IRB) of the University of Kentucky in September of 2009 and again March of 2011.

A six question survey was distributed to health professionals across the state of Kentucky via Survey Monkey©. This was a purposive sample utilizing existing listservs of health professionals including Partnership for a Fit Kentucky, Kentucky Dietetic Association, Kentucky Family and Consumer Sciences County Extension Agents, faculty of Department of Nutrition and Food Science of the University of Kentucky and a personal Facebook profile. The brevity of the survey (six questions) was to encourage response and limit the time required to complete the survey (around five minutes). The survey, entitled Kentucky Food Consumer Survey, was conducted in the summer of 2010.

An ongoing consumer survey in Kentucky and Ohio of randomly selected Households completed the same six questions in April to May, 2011. This consumer information was collected via Zoom Panel©. Demographic data were included and the survey took about eight minutes to complete.

The main portion of the survey asked participants to identify the lowest calorie option from major quick serve restaurants. In addition, two questions were concerned with determining if participants would change their pizza order if calorie information was

provided. Finally, it was asked how often participants dine out as well as their knowledge of daily caloric needs for the average 150 pound adult.

Survey Population

The study population included 849 health professionals from Kentucky, 1,040 consumers from Kentucky and 1,072 consumers from Ohio. Consumers from Kentucky and Ohio were combined to form a sample size of 2112. Fifteen surveys from the professionals were incomplete; therefore a final sample of 834 was used. Demographic information in the consumer survey included gender, age, children in the household, education, income, race, employment status and area of residence (city, suburb, small town, countryside or farm).

Statistical Analysis

SPSS ® software version 20 was used in this study for data analysis. Descriptive statistics were used to determine demographic information of the sample. Cross-tabulations, including a chi-square analysis were used to find correlations between the answers to multiple questions and to compare a possible change in answer between two questions. Cross-tabulations, including a chi-squared analysis were also used to determine differences among the professionals and consumers. An alpha level of 0.05 was considered significant in this study.

CHAPTER FOUR

Results

Demographics

The health professionals' survey consisted of a sample of 834 from Kentucky. No demographic data were collected.

The consumer sample for this survey consisted of 2112 consumers from Kentucky and Ohio. The majority of the sample was Caucasian, female and between the ages of 45-64. Close to three-quarters of the respondents did not have children in the household. About one-quarter completed some college while another one-quarter were high school graduates and one-quarter college graduates. One-quarter of the respondents had an income of \$50,000-\$74,999. One-third were employed full time while one-quarter were retired. The majority of the sample lived in the city or suburbs and prepared fresh food at home seven or more times per month. Three-quarters of the respondents support or strongly support calorie information on menus.

Table 4.1. Demographic characteristics of consumers.

Question		
	Consumer Responses	
Gender	Number	Percent
Male	654	31%
Female	1442	68.3%
Age	Number	Percent
18-24	81	3.8%
25-34	237	11.2%
35-44	326	15.4%
45-54	546	25.9%
55-64	548	25.9%
65 or older	368	17.4%
Children in the household	Number	Percent
Yes	622	29.5%
No	1490	70.5%
Education	Number	Percent
Less than 9 th grade	9	0.4%
Some high school	41	1.9%
High school graduate or equivalent	511	24.2%
Some college	550	26%
Associate degree	252	11.9%
Bachelor's degree	453	21.4%
Graduate or professional degree	290	13.7%
Prefer not to answer	6	0.3%
Income	Number	Percent
Under \$15,000	179	8.5%
\$15,000-\$24,999	217	10.3%
\$25,000-\$34,999	267	12.6%
\$35,000-\$49,999	340	16.1%
\$50,000-\$74,999	426	20.2%
\$75,000-\$99,999	257	12.2%
\$100,000-\$149,000	145	6.9%
\$150,000-\$199,999	262	12.4%
\$200,000 and up	19	0.9%

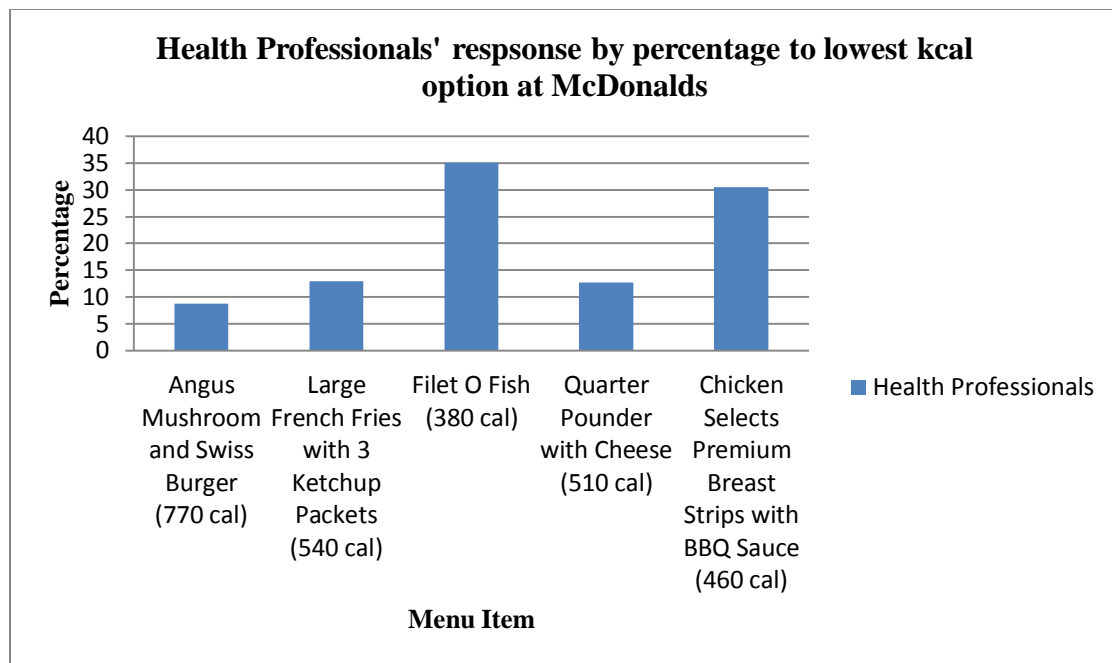
Table 4.2 (Continued). Demographic characteristics of consumers.

Race	Number	Percent
White/Caucasian	1992	91%
Spanish/Hispanic/Latino	15	0.7%
Black/African American	96	4.5%
Asian	18	0.9%
Pacific Islander	3	0.1%
Native American	11	0.5%
Other	10	0.5%
Prefer not to answer	22	1%
Employment status	Number	Percent
Employed full time	738	34.9%
Employed part time	243	11.5%
Self-employed	98	4.6%
Not employed, but looking for work	102	4.8%
Not employed, not looking for work	60	2.8%
Retired	539	25.5%
Student	61	2.9%
Homemaker	241	11.4%
Prefer not to answer	30	1.4%
Type of area of residence	Number	Percent
City	379	17.9%
Suburb	885	41.9%
Small town	421	19.9%
Countryside (but not a farm)	334	15.8%
Farm	93	4.4%
How often fresh food is prepared?	Number	Percent
Not much at all	156	7.4%
1-2 times per month	229	10.8%
3-4 times per month	309	14.6%
5-6 times per month	288	13.6%
7 or more times per month	1127	53.4%
Opinion of calorie info on menus?	Number	Percent
Strongly support calorie information	990	46.9%
Support calorie information	587	27.8%
No opinion on calorie information	446	21.1%
I oppose calorie information	37	1.8%
Strongly oppose calorie information	40	1.9%

Professionals

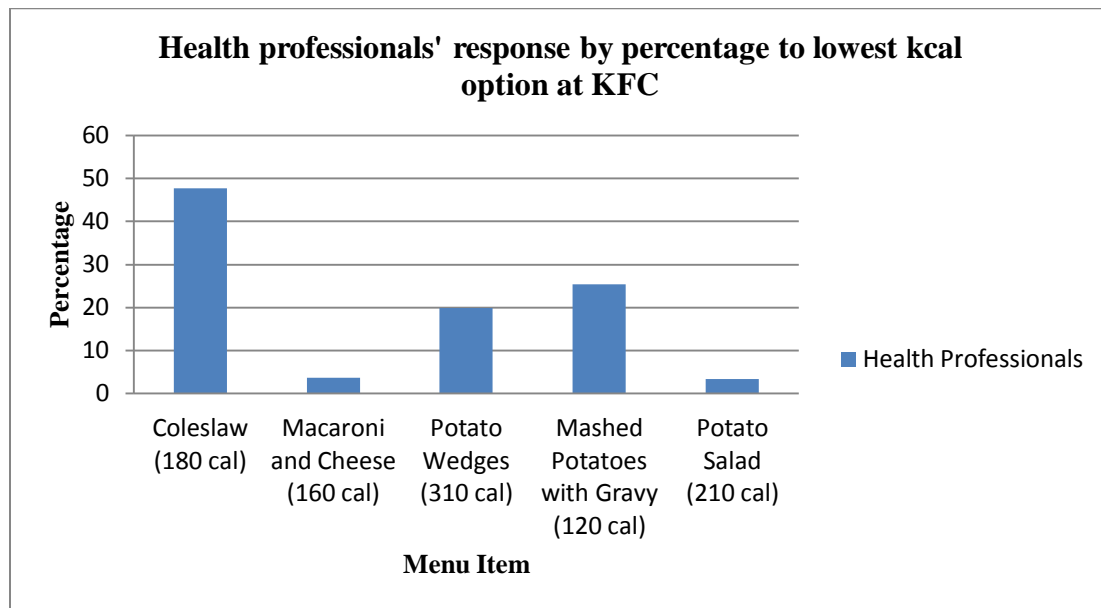
Of the 834 health professionals in the survey sample, just over one-third (35.1%) were able to choose the correct item at McDonald's that had the fewest calories, the Filet O Fish sandwich, (n=293), while 30.5% chose the item with the second fewest calories, the Chicken Selects Premium Breast Strips with BBQ Sauce (n=254).

Figure 4.1. Health professionals' response by percentage to lowest kcal option at McDonalds.



One-quarter of health professionals were not able to choose the lowest calorie item at KFC, the mashed potatoes with gravy, 25.4% (n=212). Almost half of health professionals chose the item with the third fewest calories, coleslaw, 47.7% (n=398).

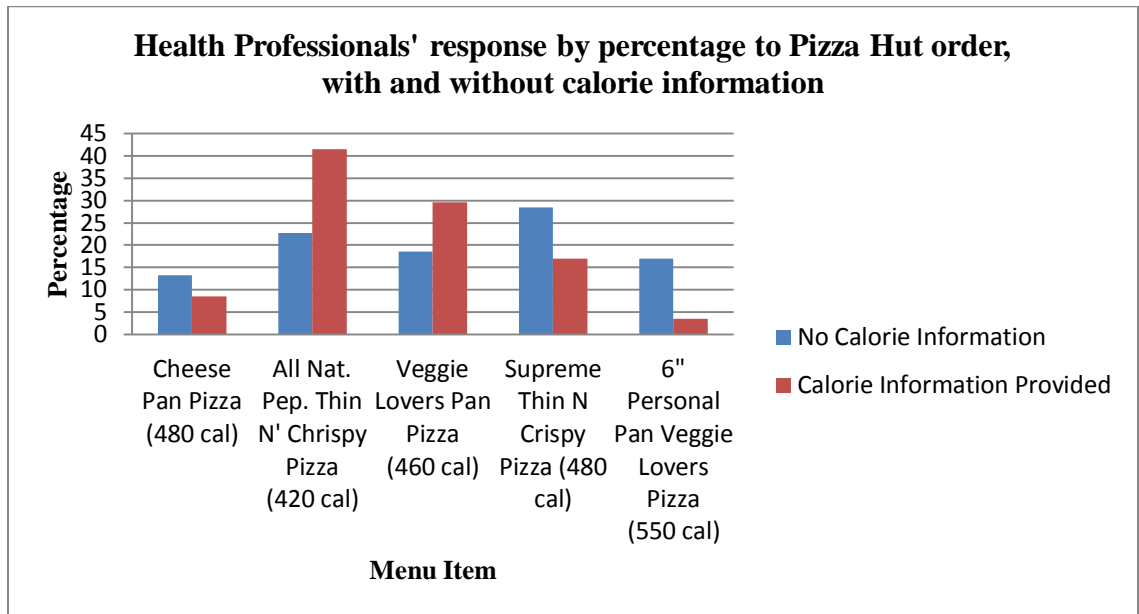
Figure 4.2. Health professionals' response by percentage to lowest kcal option at KFC.



Just over one-quarter of health professionals (28.4%) chose the third lowest calorie option for the Pizza Hut question, (n=237), which was Supreme Thin N Crispy Pizza. Close to one-quarter (22.7%) of the health professionals chose the lower calorie option (n=189), which was All Natural Thin N Crispy Pepperoni. Seventeen percent chose the 6” Personal Pan Veggie Lovers Pizza (n=142), which was the highest in calories of the five options.

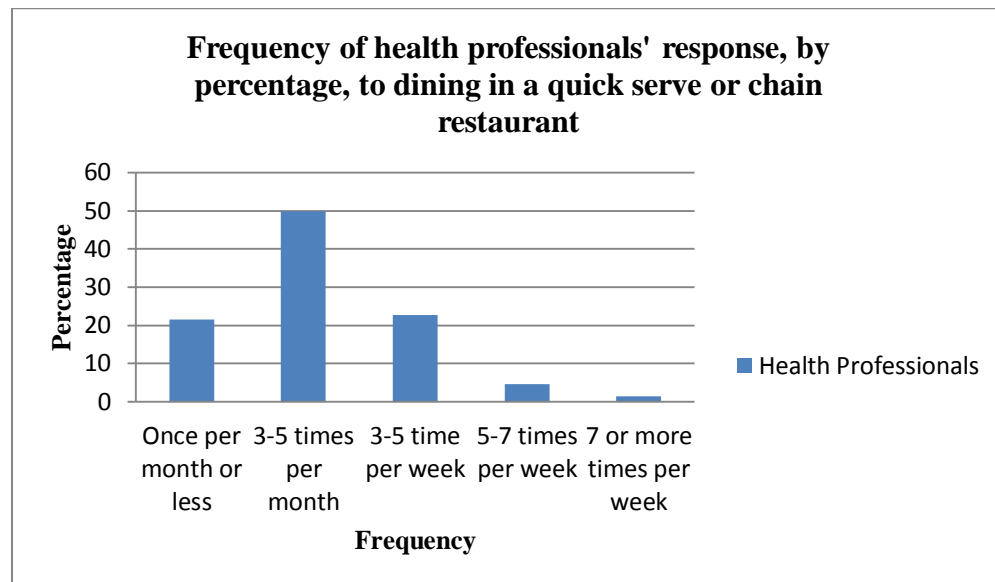
However, after giving the calorie information of the Pizza Hut menu items, a higher percentage of health professionals (41.5%) reported they would order the lowest calorie option, the All Natural Thin N Crispy Pepperoni (n=346). This was an increase in 18.8% of those ordering this item. The number ordering the Supreme Thin N Crispy Pizza, the third highest in calories, went down 11.5% to 16.9% (n=141). The number ordering the 6” Personal Pan Veggie Lovers Pizza, the highest in calories, decreased 13.4% to 3.6% (n=30).

Figure 4.3. Health professionals' response by percentage to Pizza Hut order, with and without calorie information.



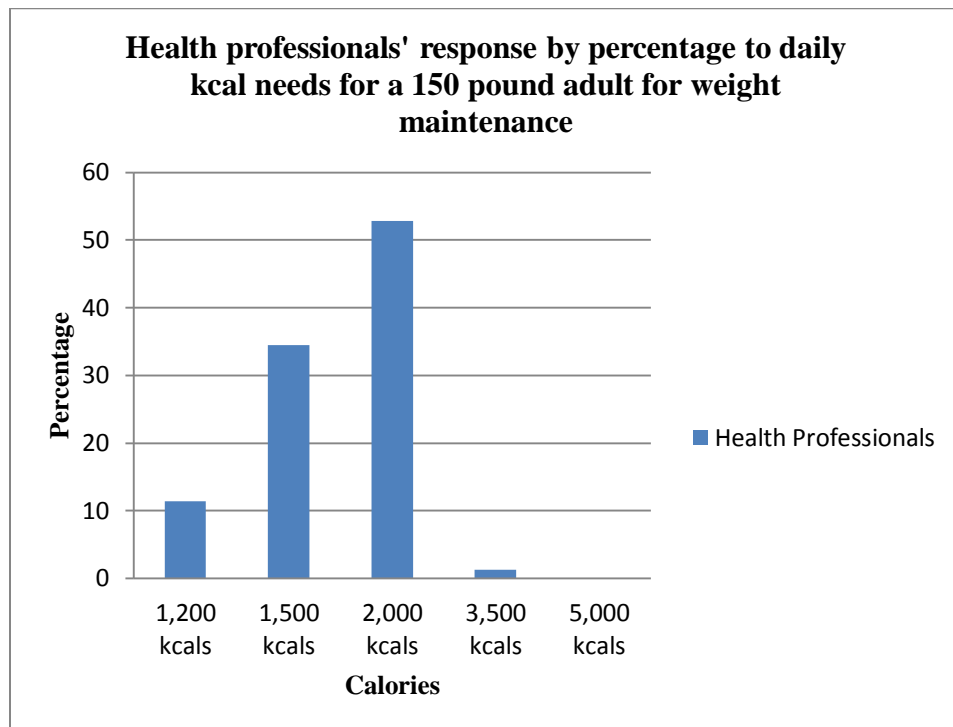
Half of the health professionals in the sample (49.9%) reported eating food from a quick serve or a chain restaurant 3-5 times per month (n=416), while 21.5% reported dining out once per month or less (n=179), 22.7% dine out 3-5 times per week (n=189), 4.6% 5-7 times per week (n=38), and 1.4% reported eating at a quick serve or chain restaurant 7 or more times per week (n=12).

Figure 4.4. Health professionals' response by percentage to frequency of dining in a quick serve or chain restaurant.



Health professionals' knowledge of the daily calorie needs of the average 150 pound adult for weight maintenance were on track with 52.8% choosing the correct answer of 2,000 kilocalories (n=440), 34.5% choosing 1,500 kilocalories (n=288), 11.4% choosing 1,200 kilocalories (n=95) and 1.3% choosing 3,500 kilocalories (n=11). No one chose 5,000 kilocalories.

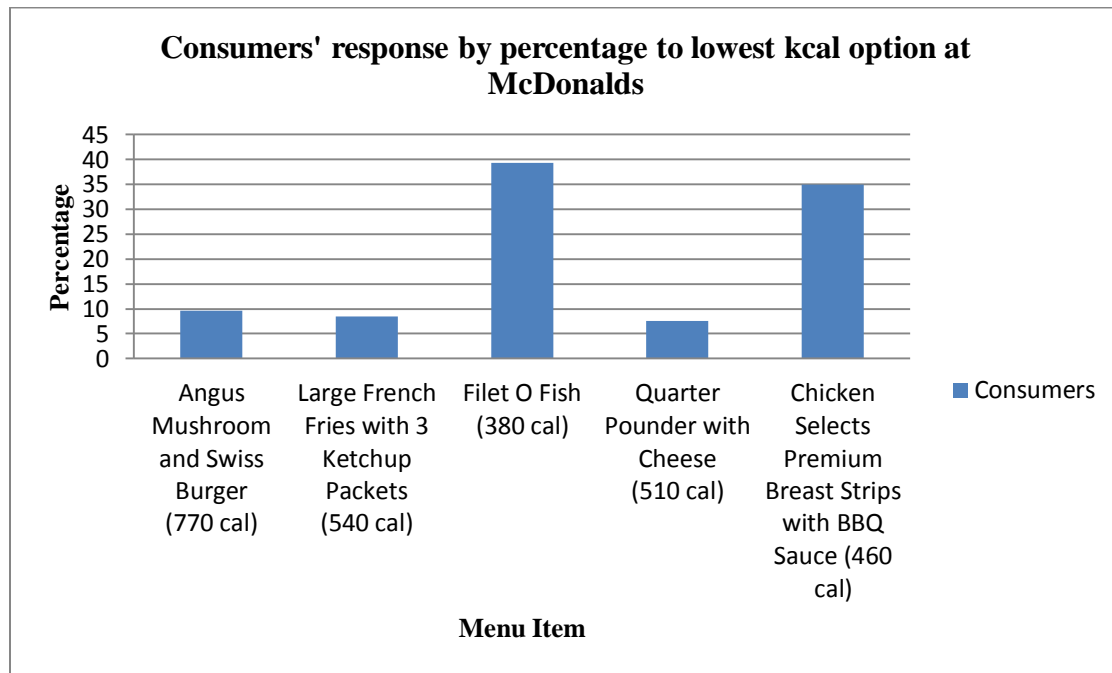
Figure 4.5. Health professionals' response by percentage to daily kcal needs for a 150 pound adult for weight maintenance.



Consumers

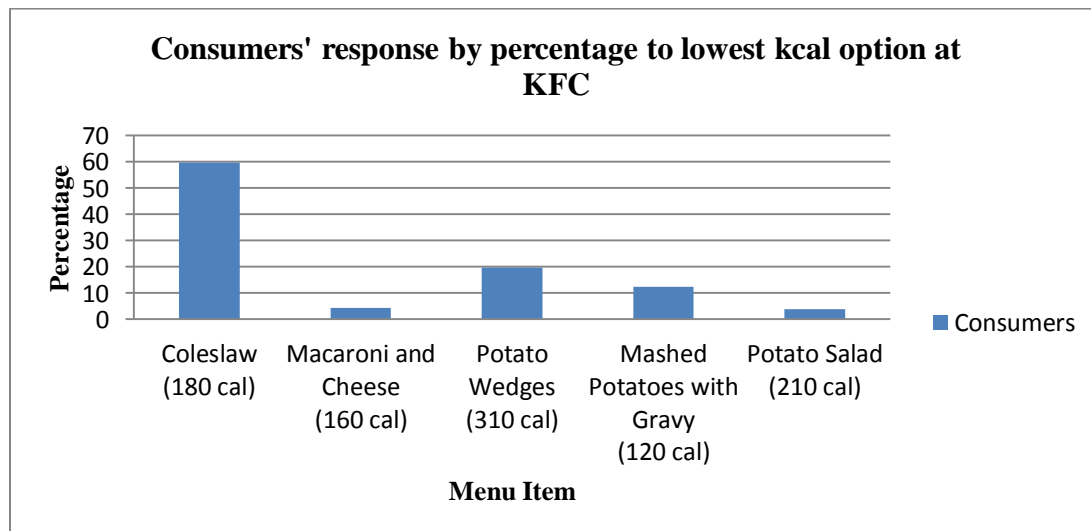
Of the 2112 consumers in the survey sample, just over one-third (39.3%) were able to choose the correct item from McDonalds with the fewest calories, the Filet O Fish (n=831), while 35% chose the item with the second fewest calories, the Chicken Selects Premium Breast Strips with BBQ Sauce (n=740).

Figure 4.6. Consumers' response by percentage to lowest kcal option at McDonalds.



Few consumers were able to choose the correct item from KFC with the fewest calories, the mashed potatoes with gravy (12.5%, n=265). Over half of the sample chose coleslaw (59.6%, n=1259) followed by the potato wedges (19.7%, n=417).

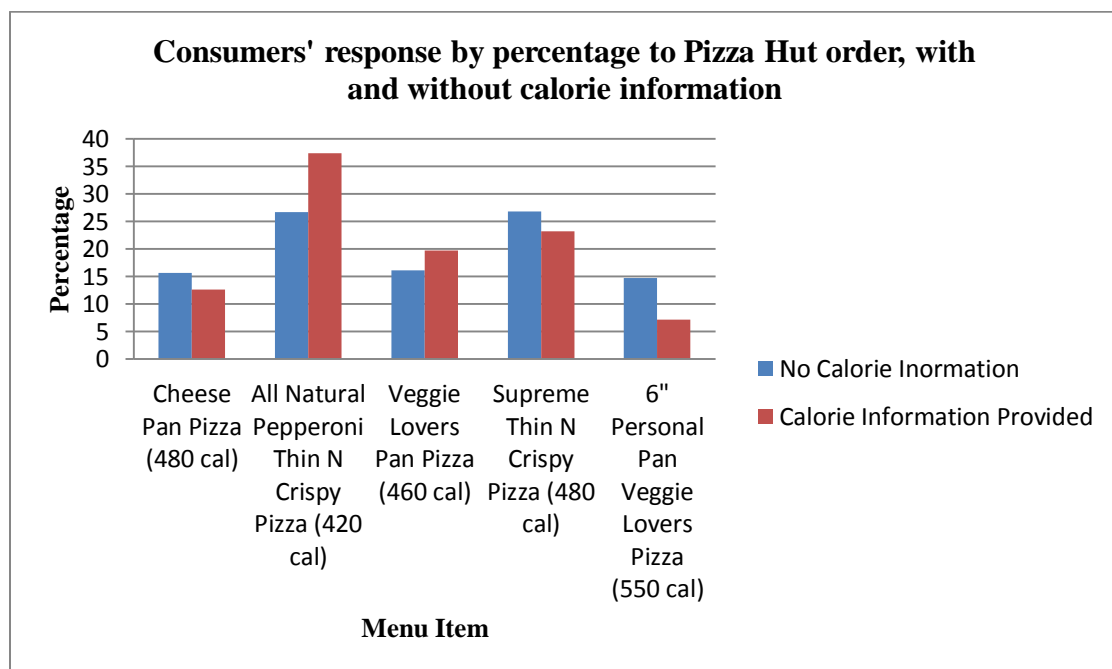
Figure 4.7. Consumers' response by percentage to lowest kcal option at KFC.



Just over one-quarter of consumers (26.7%) chose the lower calorie option (n=564), which was All Natural Thin N Crispy Pepperoni. A similar amount of consumers (26.8%) chose the third lowest calorie option for the Pizza Hut question, (n=566), which was Supreme Thin N Crispy Pizza, while 14.7% chose the 6” Personal Pan Veggie Lovers Pizza (n=311), which was the highest in calories of the five options.

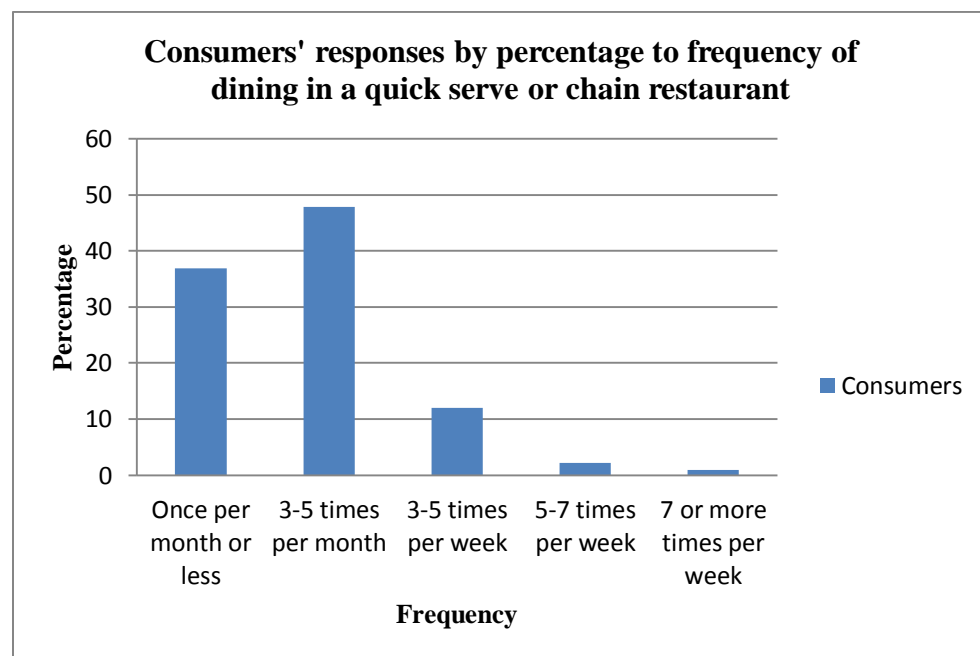
However, after giving the calorie information of the Pizza Hut menu items, over one-third of consumers (37.4%) reported they would order the lowest calorie option, the All Natural Thin N Crispy Pepperoni (n=789). This was an increase in 10.7% of those ordering this item. The number ordering the Supreme Thin N Crispy Pizza, the third highest in calories, reduced by 3.6% to 23.2% (n=489). The number ordering the 6” Personal Pan Veggie Lovers Pizza, the highest in calories, went down 7.5% to 7.2% (n=152).

Figure 4.8. Consumers’ response by percentage to Pizza Hut order, with and without calorie information.



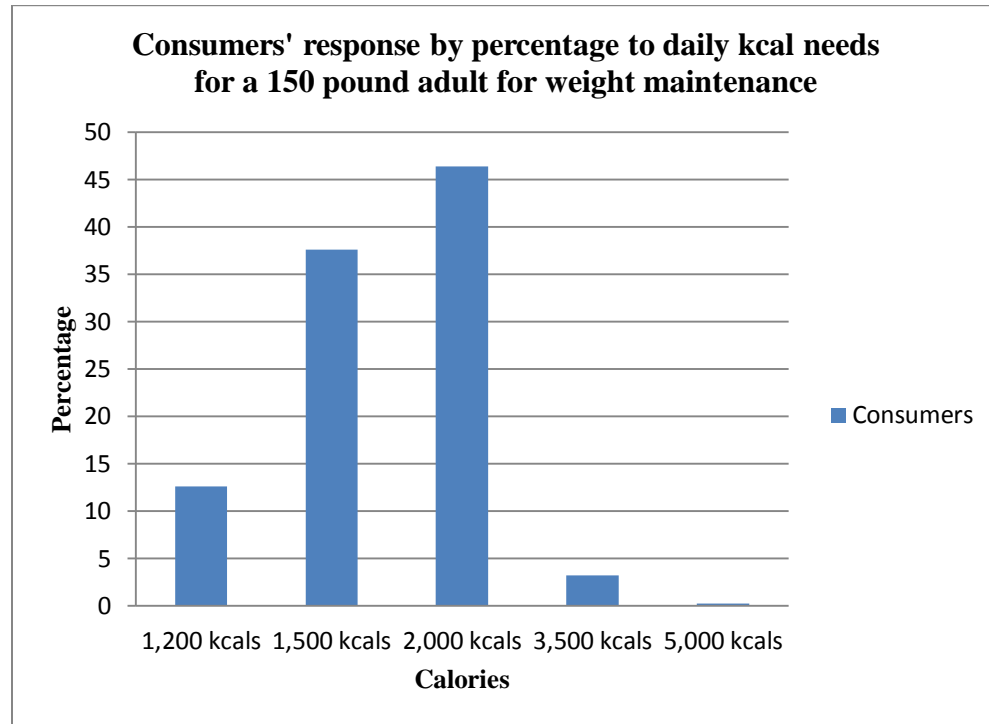
Just under one-half of consumers in the sample (47.9%) reported eating food from a quick serve or a chain restaurant 3-5 times per month (n=1012), while 36.9% reported once per month or less (n=780), 12% dine out 3-5 times per week (n=253), 2.2% 5-7 times per week (n=47), and 0.9% reported eating at a quick serve or chain restaurant 7 or more times per week (n=20).

Figure 4.9. Consumers' responses by percentage to frequency of dining in a quick serve or chain restaurant.



Consumers knowledge of the daily calorie needs of the average 150 pound adult in order to maintain weight were on track with 46.4% choosing the correct answer of 2,000 kilocalories (n=979), 37.6% choosing 1,500 kilocalories (n=795), 12.6% choosing 1,200 kilocalories (n=267), 3.2% choosing 3,500 kilocalories (n=67), and 0.2% choosing 5,000 kilocalories per day (n=4).

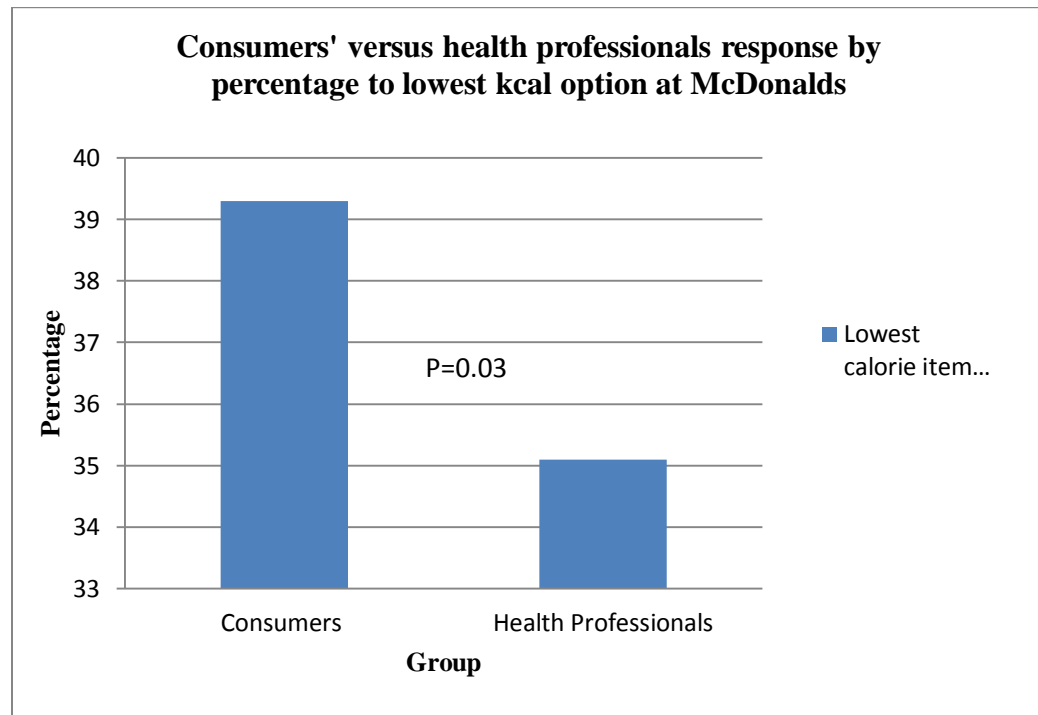
Figure 4.10. Consumers' response by percentage to daily kcal needs for a 150 pound adult for weight maintenance.



Consumers versus Health Professionals

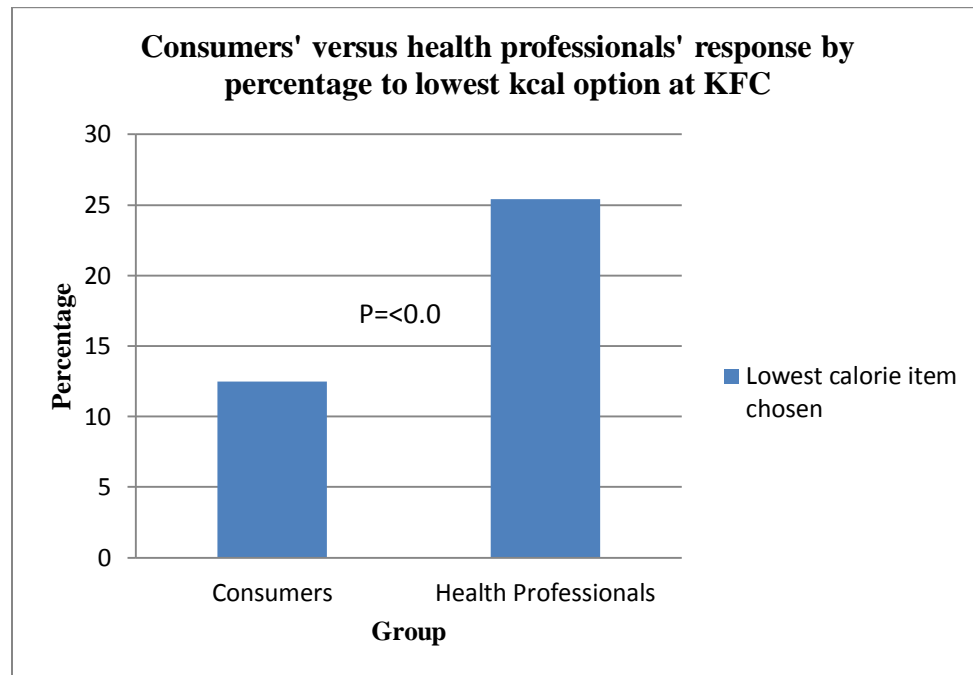
Comparisons of consumers versus health professionals showed a significant difference in how many choose the correct answer. Consumers were better able to identify the lower calorie option served at McDonalds, 39.3% of consumers were able to correctly identify the lowest calorie option from McDonalds, while 35.1% of the health professionals were able to correctly identify the lowest calorie option at McDonalds. This difference is significant by a chi squared p-value of 0.03.

Figure 4.11. Consumers' versus health professionals' response by percentage to lowest kcal option at McDonalds.



Health professionals were better able to identify the lower calorie option served at KFC, 12.5% of consumers were able to correctly identify the lowest calorie option at KFC, while 25.4% of the health professionals were able to correctly identify the lowest calorie option. This difference is significant by chi squared p-value of less than 0.01.

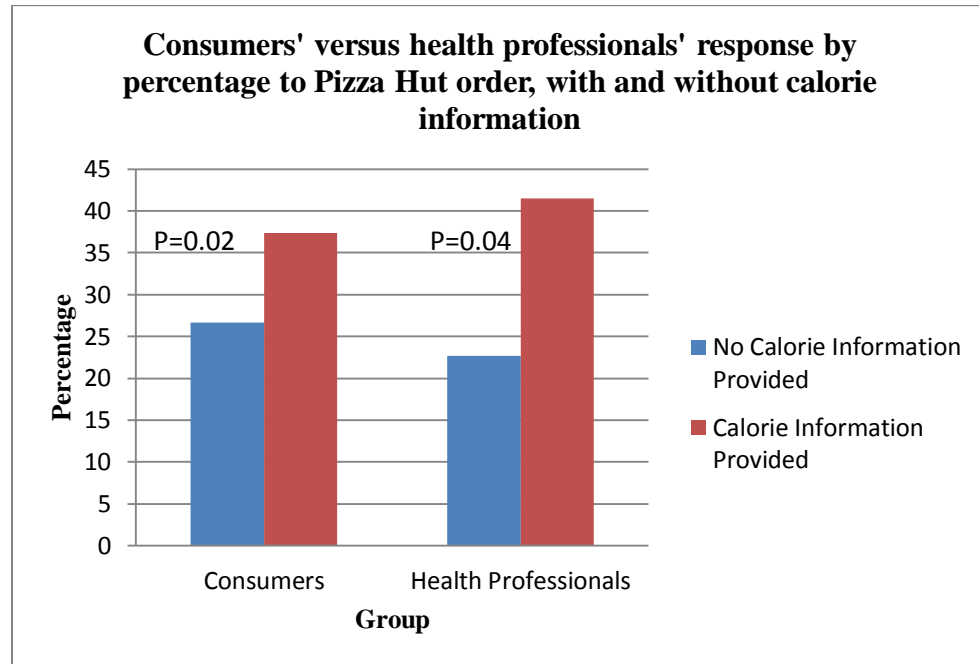
Figure 4.12. Consumers' versus health professionals' response by percentage to lowest kcal option at KFC.



Consumers were better able to select the lowest calorie option for consumption at Pizza Hut without calorie labels, 26.7% of consumers chose to order the lowest calorie option item from a list of Pizza Hut items when the calories were not labeled, 22.7% of professionals did the same. This difference is significant by a chi squared p-value of 0.02.

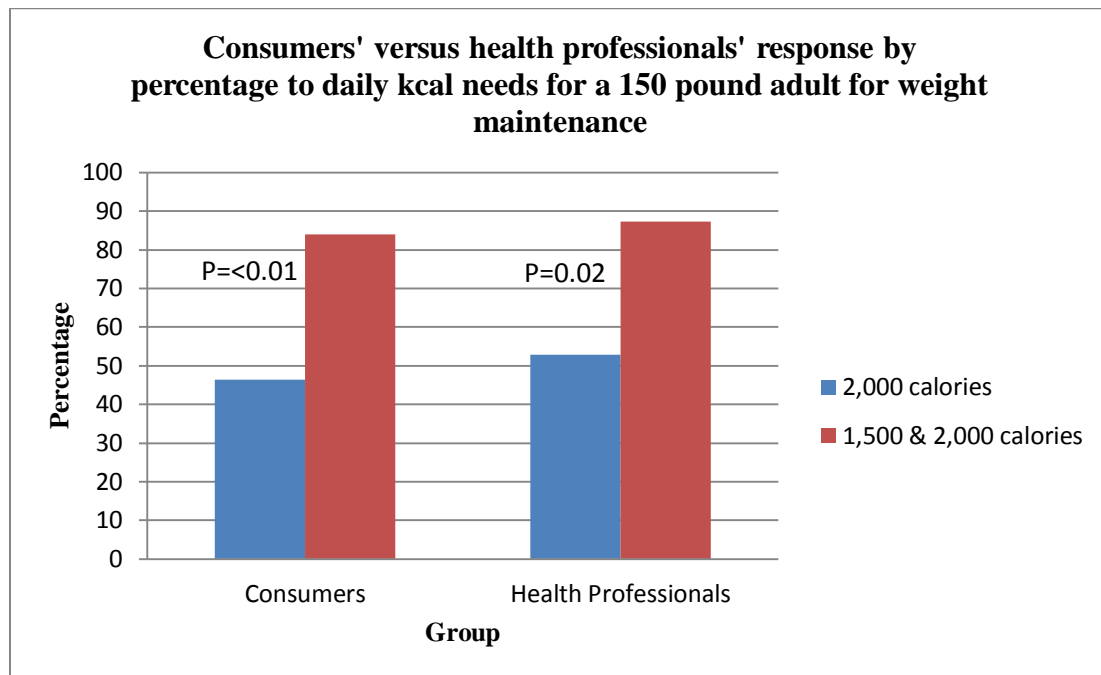
However, when given the same options from Pizza Hut as before, but with calorie information provided, health professionals were more likely to order the low calorie item; 37.4% of consumers chose the lowest calories option while 41.5% of health professionals chose the lowest calorie option. This difference is significant by a chi squared p-value of 0.04.

Figure 4.13. Consumers' versus health professionals' response by percentage to Pizza Hut order, with and without calorie information.



Health professionals were more likely to know how many calories per day were needed for the average, moderately active adult; 46.4% of consumers were able to correctly identify the correct amount of calories needed by a moderately active 150 pound adult, while 52.8% of professionals chose the correct answer (2000 calories). This difference was significant by a chi squared p-value of less than 0.01. When considering 1500 calories a correct as well, 84% of consumers chose the correct answer while 87.3% of health professionals were correct. This difference is significant by a chi squared p-value of 0.02.

Figure 4.14. Consumers' versus health professionals' response by percentage to daily kcal needs for a 150 pound adult for weight maintenance.



Results by Research Question

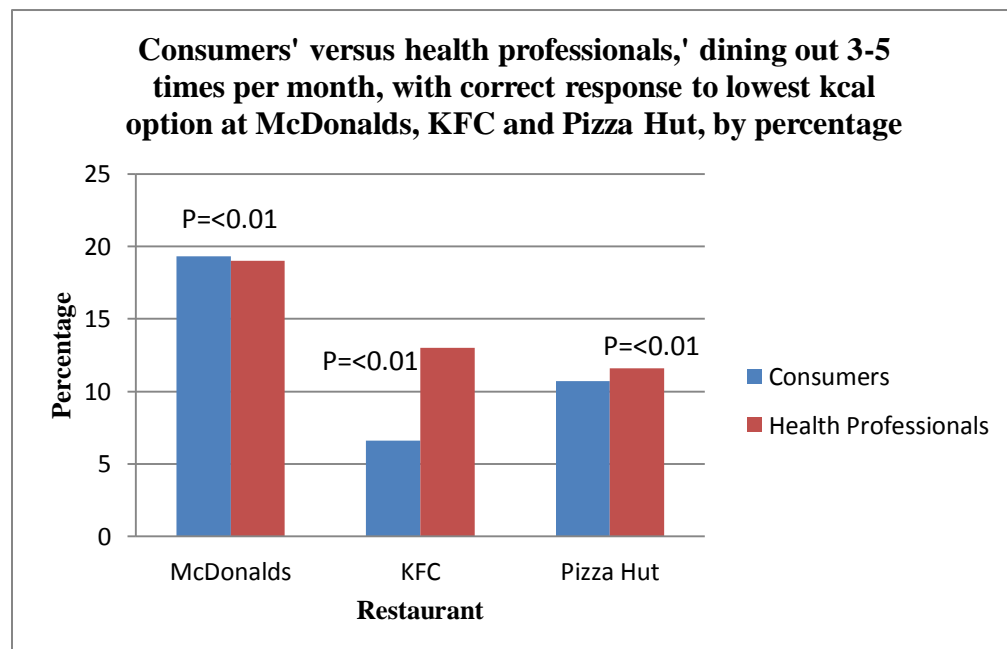
Is There a Relationship Between Frequency of Quick Serve Consumption and the Ability to Identify Lower Calorie Options at Quick Serve Restaurants?

For both groups, consumers and health professionals, those eating quick serve 3-5 times per month were better able to choose the correct answer for the lowest calorie menu item at McDonalds, KFC and Pizza Hut. Approximately 19.3% of consumers who correctly identified the low calorie menu item at McDonalds reported eating out 3-5 times per month. Nineteen percent (19%) of health professionals, who correctly identified the lowest calorie menu item at McDonalds, reported eating out 3-5 times per month. This is significant by a chi squared p-value of less than 0.01.

About 6.6% of consumers who correctly identified the low calorie item at KFC reported eating out 3-5 times per month. Thirteen percent of health professionals who correctly identified the lowest calorie menu item at KFC reported eating out 3-5 times per month. This is significant by the chi squared p-value of less than 0.01.

Approximately 10.7% of consumers who would choose the lowest calorie option from Pizza Hut without calorie labels report eating out 3-5 times per month, while 11.6% of health professionals who would choose the lowest calorie pizza option from Pizza Hut without calorie labels report eating out 3-5 times per month. This is significant by a chi squared p-value of less than 0.01.

Figure 4.15. Consumers' versus health professionals,' dining out 3-5 times per month, with correct response to lowest kcal option at McDonalds, KFC and Pizza Hut, by percentage.



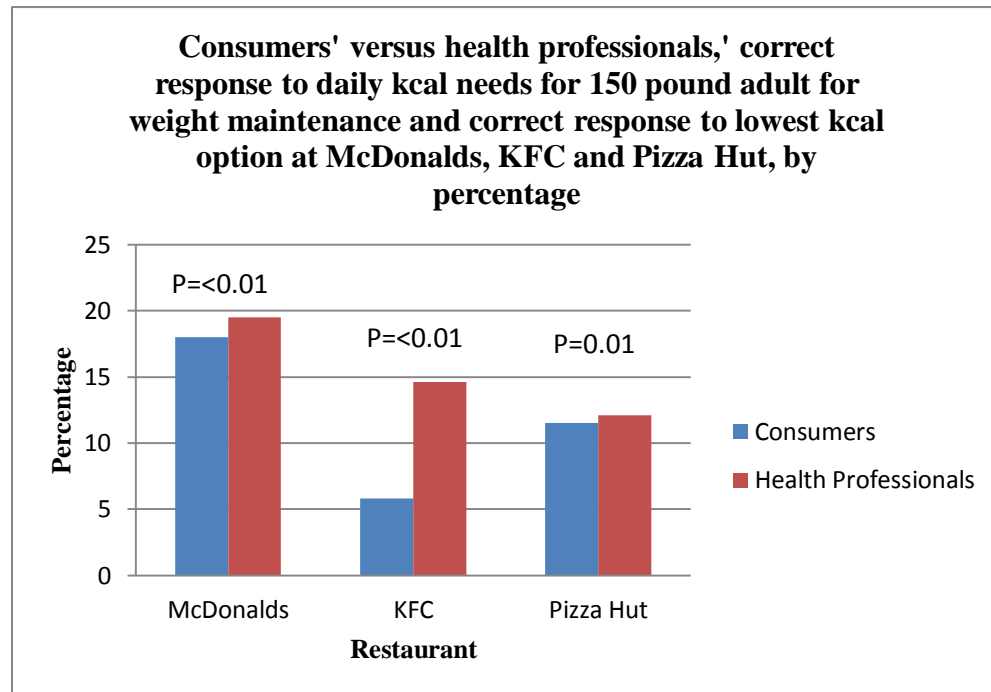
Is There a Relationship Between Correctly Identifying Daily Calorie Requirements and the Ability to Identify Lower Calorie Options from Quick Serve Restaurants?

Professionals were better able to determine the adequate amount of calories for the average adult and identify low calorie options at quick serve restaurants compared to consumers. Eighteen percent of consumers were able to correctly identify the lowest calorie option at McDonalds and correctly identified the adequate amount of calories for the average adult while 19.5% of health professionals were able to do this (19% average). This difference is significant by a chi squared p-value of less than 0.01.

About 5.8% of consumers were able to correctly identify lowest calorie option at KFC and were able to correctly identify the adequate amount of calories for the average adult while 14.6% of health professionals were able to do this (8% average). This difference is significant by a chi squared p-value of less than 0.01.

Approximately 11.5% of consumers ordered the lowest calorie option at Pizza Hut without calorie information and were able to correctly identify the adequate amount of calories for the average adult while 12.1% of professionals were able to do this (12% average). This difference is significant by a chi squared p-value of 0.01.

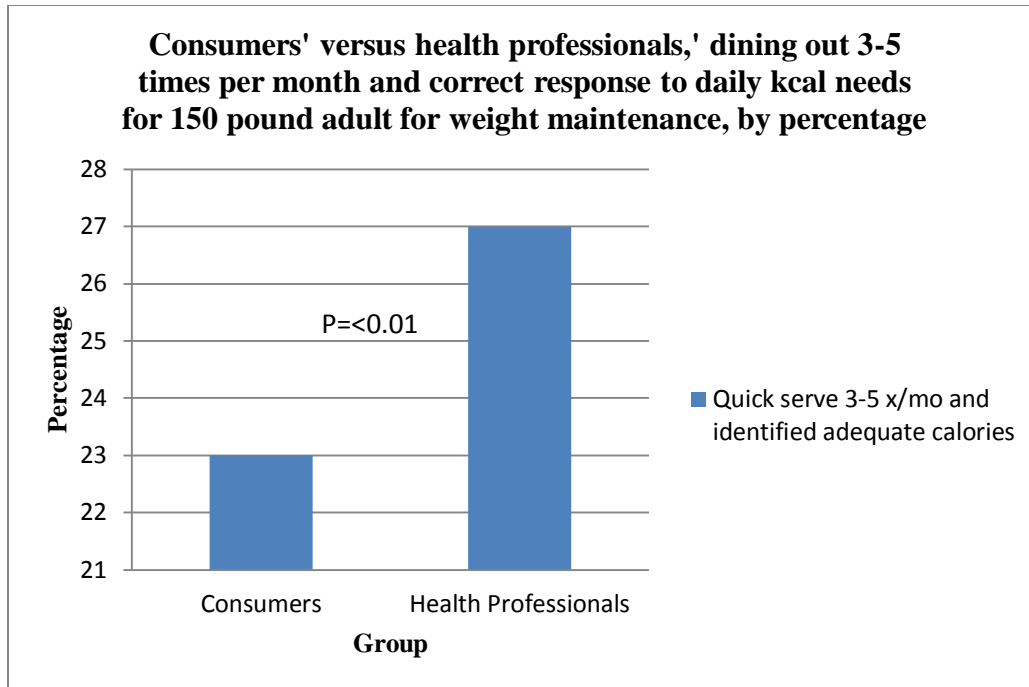
Figure 4.16. Consumers' versus health professionals,' correct response to daily kcal needs for 150 pound adult for weight maintenance and correct response to lowest kcal option at McDonalds, KFC and Pizza hut, by percentage.



Is There a Relationship Between Frequency of Quick Serve Food Consumption and the Ability to Correctly Identify Daily Calorie Requirements?

Those partaking in quick serve 3-5 times per month for both groups, both consumers and health professionals, who ate at quick serve restaurants 3-5 times monthly, were more likely to identify the adequate amount of calories for the average adult. Twenty three percent of consumers fit into this group, and 27% of health professionals. This difference is significant by a chi squared p-value of less than 0.01.

Figure 4.17. Consumers' versus health professionals,' dining out 3-5 times per month and correct response to daily kcal needs for 150 pound adult for weight maintenance, by percentage.



Summary

Table 4.2. Percentage of respondents who answered survey questions correctly.

Question	% of Consumers	% of Professionals	Chi² p-value
McDonalds	39.3	35.1	0.03
KFC	12.5	25.4	<0.01
Pizza Hut #1	26.7	22.7	0.02
Pizza Hut #2	37.4	41.5	0.04
Calories per day (1500)	46.4	52.8	0.01
Calories per day (1500 & 2000)	84	87.3	0.02

Table 4.3. Percentage of respondents who consume quick serve 3-5 times per month and were able to correctly identify lower calorie options at quick serve restaurants.

Question	% of Consumers	% of Professionals	Chi² p-value
McDonalds	19.3	19	<0.01
KFC	6.6	13	<0.01
Pizza Hut	10.7	11.6	<0.01

Table 4.4. Percentage of respondents who were able to correctly identify adequate calories for the average 150 pound adult for weight maintenance and correctly identify low calorie options at quick serve restaurants.

Question	% of Consumers	% of Professionals	Chi² p-value
McDonalds	18	19.5	<0.01
KFC	5.8	14.6	<0.01
Pizza Hut	11.5	12.1	<0.01

CHAPTER FIVE

Discussion

The purpose of the study was to assess the need for menu labeling of calories based on the ability of food consumers to identify lower calorie options. By surveying consumers in both Kentucky and Ohio, and health professionals in Kentucky about their awareness of calorie information, basic nutrition knowledge and ability to choose lower calories options, it may be possible to predict the potential benefit of menu labeling initiatives and the amount of education required for consumers to use menu labeling.

There are several limitations to this study. First, the survey questions were not pre-tested in order to determine validity or reliability. Second, the health professionals' survey was a convenience sample and was not randomly selected. Third, there is no demographic data on the health professionals. Finally, the survey was only distributed to people with internet access.

The first research question asked if health professionals and consumers can correctly identify the lowest calorie options from common quick serve items such as sandwiches, pizza and side items. The researcher thought that health professionals would be better able to identify these low calorie options compared to consumers. However, this was only the case in one out of the three questions, the side item at KFC. Research has shown that on average, people underestimate calories of unhealthy items at restaurants by 642 calories (Burton et al., 2006). Past research has also shown that dietitians may also underestimate calories in restaurant meals by 200-600 calories similar to the general public (Backstrand et al., 1997). These estimation discrepancies indicate the need for menu labeling for the benefit of all restaurant patrons.

The second research question asked if there was a relationship between the frequency of quick serve consumption and the ability to identify lower calorie options at three quick serve restaurants. It was found that those eating at quick serve restaurants 3-5 times per month were better able to identify low calorie options. Given that the restaurant industry garners 49% of food dollars (National Restaurant Association, 2011), eating out about once a month is below average. Therefore, it seems that those eating out less frequently are better able to identify low calorie options. However, one study found that those more likely to use Nutrition Facts labels were generally more health conscious, had specific health concerns, or may be currently dieting (Stein, 2010a). This may also be true for those who eat out at quick serve locations less frequently.

The third research question asked if there is a relationship between correctly identifying daily calorie requirements and the ability to identify lower calorie options at three quick serve restaurants. For the McDonalds, KFC and Pizza Hut calorie questions, 19%, 8% and 12% of the sample were able to correctly identify the low calorie option as well as the daily calorie requirements, respectively. Professionals were better able to correctly identify both of these for all three calorie questions. This is due to the ability of health professionals to identify the daily calorie requirements more accurately than consumers. Other studies have identified the percentage of consumers able to identify their adequate calorie count as 64-73%. However, this included a wide range of answers (1500-2500 calories) (Krukowski et al., 2006) instead of exact amounts as in this survey.

The fourth research question asked if there was a relationship between frequency of quick serve consumption and the ability to correctly identify daily calorie requirements. Those eating quick serve 3-5 times per month were more likely to

correctly identify daily calorie requirements, for both professionals and consumers. Again, those only eating out about once a week may be more health conscious individuals, may have a specific health concern, or may be currently dieting (Stein, 2010a).

The fifth research question asked if consumers would alter their choice of pizza if calorie information is readily available on the menu. The number of consumers ordering the lowest calorie item increased by 10.7% and the number ordering the highest calorie option was reduced by 7.5%. Consumers have expressed interest in having and utilizing menu labels (Friedman, 2008; U.S. Department of Health and Human Services, 2001). The results here show that consumers will alter decisions based on menu labels.

The sixth research question asked about differences between health professionals and consumers in relation to frequency of quick serve consumption, altering quick serve orders with calorie information and correctly identifying low calorie options. About half of health professionals consume quick serve 3-5 times per month while about half of consumers also report consuming quick serve 3-5 times per month. As this was a health survey, some of the respondents may have felt pressure to be perceived as healthy, and therefore were not truthful on this question. Based on the data available on quick serve consumption, consumers' frequency should be higher than once per month.

Health professionals were more likely to change their pizza order with menu labeling available. Consumers increased the number ordering the lowest calorie item by 10.7% and reduced the ordering of the highest calorie item by 7.5%. Health professionals made a more drastic change in their order by increasing the number of

people ordering the low calorie option by 18.8% and decreasing the ordering of the high calorie option by 13.4%. Health professionals are more health conscious overall, therefore are more likely to use menu labeling to make a healthier decision (Stein, 2010a). Consumers were better able to correctly identify the low calorie options at McDonalds and Pizza Hut while health professionals were better able to identify the lowest calorie option at KFC. This data confirms that health professionals are in no way better at predicting calorie levels of food purchased at restaurants.

Health professionals and consumers alike would benefit from menu labeling in being able to make sound nutritional decisions when dining out. However, education will be a key step in informing food consumers about daily calorie needs and how to use menu labeling to make healthier decisions. As stated by the Academy of Nutrition and Dietetics, nutrient data alone—without complementary nutrition education as well as how to use the information—will not be enough to combat obesity.

However, health professionals are most concerned about nutrient density of foods—not just caloric content. Nutrient density is a measure of nutrients in a food item compared to overall calories. Therefore the most nutritious food items contain a high ratio of nutrients to calories. From calorie level along, food consumers will not be able to determine nutrient density. Education comes into play regarding nutrient density as well. Being familiar with nutrient dense foods can help consumers make sound nutritional decisions while dining out, which can have positive effect on the overweight and obesity epidemic.

CHAPTER SIX

Conclusion

Poor diet and lack of physical activity have contributed to the obesity epidemic. Heart disease is now the number one cause of death each year for men and women. About 2/3 of individuals are overweight or obese, increasing the risk of heart disease and other complications. Weight gain is caused by an imbalance of energy intake and output; more calories consumed than expended. This increase in obesity has also come at a time when the restaurant industry garners 49% of food dollars and portion sizes are growing larger than ever. Developing policies and environments that support healthy eating are new suggested approaches to combating obesity. Point-of-purchase nutrition information would fit into this environmental and policy category. It would provide consumers with the knowledge to make informed decisions. This study has concluded that consumers want this information and will utilize it to make healthier choices.

However, this study has also concluded that nutrition education is necessary, especially concerning how one meal fits into the overall diet. Only 48% of the sample correctly identified the amount of calories needed daily to maintain weight. This shows much need for improvement.

Finally, this study concluded that health professionals are not better able than consumers to predict the amount of calories in quick serve food items. They were only successful with the side item, not the pizza and sandwich. This shows that despite extensive nutrition knowledge, it is hard to tell how many calories are in restaurant food items.

These findings have important implications for the support of menu labeling laws in the future. With the strong support of the general public, menu labeling seems like a credible option in the fight against obesity. With the exclusion from the labeling law of restaurants with less than 20 locations, small local restaurants will not feel the financial burden of calorie content analysis. While menu labeling will be a large burden for restaurants at first, it will become easier and could make a difference in consumer consumption.

These findings also have important implications for developing educational programs and materials for restaurants to supplement their menu labeling. These will help patrons understand how their current meal fits into their overall diet. Without this basic nutrition knowledge, menu labeling will not necessarily aid in the reduction of caloric intake.

Future research should focus on nutrition education of the average consumer. This way, educational materials can be tailored to this population. Reduction of obesity rates and prevention of obesity are top priorities and menu labeling supported by good understanding of basic nutrition could play a key role in the future.

APPENDICES

Appendix A: IRB Approval Documentation



EXEMPTION CERTIFICATION

Office of Research Integrity
IRB, IACUC, RDRG
315 Kioskad Hall
Lexington, KY 40506-0057
859 257-9428
fax: 859 257-8995
www.research.uky.edu/ori/

MEMO: Janet Tietjen, Ph.D.
Nutrition & Food Science
206J Funkhouser Bldg
0054

PI phone #: (859)257-1812

FROM: Institutional Review Board
c/o Office of Research Integrity

SUBJECT: Exemption Certification for Protocol No. 10-0147-X4B

DATE: March 25, 2010

On March 24, 2010, it was determined that your project entitled, *Survey of Kentucky Food Consumers*, meets federal criteria to qualify as an exempt study.

Because the study has been certified as exempt, you will not be required to complete continuation or final review reports. However, it is your responsibility to notify the IRB prior to making any changes to the study. Please note that changes made to an exempt protocol may disqualify it from exempt status and may require an expedited or full review.

The Office of Research Integrity will hold your exemption application for six years. Before the end of the sixth year, you will be notified that your file will be closed and the application destroyed. If your project is still ongoing, you will need to contact the Office of Research Integrity upon receipt of that letter and follow the instructions for completing a new exemption application. It is, therefore, important that you keep your address current with the Office of Research Integrity.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's Guidance and Policy Documents web page [<http://www.research.uky.edu/ori/human/guidance/tm#PIresp>]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [<http://www.research.uky.edu/ori/>]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

Appendix B: Definition of Terms

Quick serve – fast food restaurant.

Calorie – a unit of energy, in this case, the energy that humans get from food

Menu labeling – the labeling of a menu by a restaurant with nutritional information for consumers to observe at point-of-purchase. Most commonly this refers to calories, but also included can be grams of fat, grams of carbohydrates, and milligrams of sodium.

Point-of-purchase – the moment when a consumer is looking at options and choosing which to buy

Social Ecology model – a theory that examines the how five physical and socio-cultural environments interrelated and how they influence individuals and their decisions, behaviors and beliefs. The five elements are individual, interpersonal, environmental, community and public policy.

Appendix C: Survey

1. Which of the following items served at McDonalds do you think has the fewest calories?
 - a. Quarter Pounder with Cheese
 - b. Large French Fries with 3 Ketchup Packets
 - c. Filet O Fish
 - d. Chicken Selects Premium Breast Strips with BBQ sauce
 - e. Angus Mushroom and Swiss
2. Which of the following side items served at KFC has the fewest calories?
 - a. Macaroni and Cheese
 - b. Potato Wedges
 - c. Mashed Potatoes with Gravy
 - d. Potato Salad
 - e. Coleslaw
3. Which of these menu items would you order from Pizza Hut?
 - a. Cheese Pan Pizza (2 slices of a 12" pizza)
 - b. All Natural Pepperoni Thin N Crispy Pizza (2 slices of a 12" pizza)
 - c. Veggie Lover's Pan Pizza (2 slices of a 12" pizza)
 - d. Supreme Thin N Crispy Pizza (2 slices of a 12" pizza)
 - e. 6" Personal Pan Veggie Lover's Pizza
4. Which of these menu items would you order from Pizza Hut if calories were available on the menu?
 - a. Cheese Pan Pizza (2 slices of a 12" pizza), 480 calories
 - b. All Natural Pepperoni Thin N Crispy Pizza (2 slices of a 12" pizza), 420 calories
 - c. Veggie Lover's Pan Pizza (2 slices of a 12" pizza), 460 calories
 - d. Supreme Thin N Crispy Pizza (2 slices of a 12" pizza), 480 calories
 - e. 6" Personal Pan Veggie Lover's Pizza, 550 calorie
5. How often do you eat food from a quick serve or chain restaurant?
 - a. Once per month or less
 - b. Three to five times per month
 - c. Three to five times per week
 - d. Five to seven times per week
 - e. More than seven times per week

6. A moderately active 150 pound U.S. adult needs the following number of calories per day to maintain current weight:
- a. 1200
 - b. 1500
 - c. 2000
 - d. 3500
 - e. 5000

Thank you so much for your participation! If you are interested in becoming involved in creating a healthier Kentucky, please contact one of these organizations: Kentucky Foundation for a Healthy Kentucky <http://www.healthy-ky.org>, Partnership for a Fit Kentucky <http://www.fitky.org>, Kentucky Dietetic Association <http://www.kyeatright.org>, and Kentucky Youth Advocates <http://www.kyyouth.org>.

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