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RESEARCH ARTICLES

The Impact of Caloric Information on College Student's Fast Food Purchasing Intentions

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Background: Fast food establishments are available on many college campuses and, as a result, many students consume foods that are high in calories and contribute to unhealthy weight gain. **Purpose:** This study measured college students' knowledge of the calorie content for fast food items and whether the provision of calorie information for those foods influenced their future purchasing intentions. **Method:** Randomly selected undergraduate college students ($N = 201$) completed an online survey that measured baseline knowledge of calorie content for a fast food item and intention to purchase that item in the future. After provision of accurate calorie information, students were posttested for intention to purchase that item in the future. **Results:** The majority of students underestimated calorie content for fast food items. After receiving accurate calorie information, those who initially underestimated calorie content were significantly more likely to change their intention to purchase that food item in the future. **Discussion:** Many college students are interested in avoiding high-calorie fast food items but are uninformed about calorie content. **Translation to Health Education Practice:** Colleges should provide calorie information for fast food items at the point of purchase so that students can make informed decisions that will promote their health.

BACKGROUND

College is an important transition when many young adults first obtain full control over all daily food choices. According to the Academy of Nutrition and Dietetics, dietary choices during early adulthood can impact risk for overweight and obesity, cardiovascular and cerebrovascular disease, diabetes mellitus, some types of cancer, and osteoporosis.[1] Additionally, the Academy concluded that adolescents' dietary and physical activity choices during this crucial period can have long-lasting implications for their longevity and quality of life.[1] Unfortunately, research has shown that a high percentage of college students underconsume fruits and vegetables[2] and overconsume nutrients that should be eaten in moderation like fats, sodium, and sugar.[3–5] College is also a time when many young adults gain weight, which can also impact their health outcomes and rates of chronic disease and obesity later in life.[6–8] One contributing factor to poor nutritional intake and weight gain is the meals consumed at fast food restaurants, which are often high in calorie content.[9,10] Fast food restaurants are located on many college campuses and are often included in university meal plans, making it convenient for students to purchase this food.

Health behavior theories are widely used to guide the development of programs to promote positive changes in nutritional intake. In their extensive review of literature on

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the application of behavior change theories to nutrition counseling, the American Dietetic Association identified cognitive–behavioral theory (CBT) as an effective framework for changing dietary behaviors in ways that reduce health risk factors.[11] CBT is built upon the assumption that cognitive events mediate behavior change.[12] CBT-based interventions focused on weight loss or obesity prevention typically provide a structured approach to setting goals for calorie intake and calorie expenditure.[11] Key to this approach is knowledge about which foods are high in calories.

The ecological perspective is another framework that guides many nutrition interventions.[13] Originally developed by Brofenbrenner,[14] the social ecological model proposes that behavior affects and is affected by multiple levels of influence. This model has been modified over time for many different applications. The ecological model that is commonly used for health promotion programs was proposed by McLeroy et al. in 1988 and categorizes influence at intrapersonal, interpersonal, institutional, community, and public policy levels.[15] Individual-level factors for nutrition interventions may include accurate knowledge about the nutritional content of foods that are available for purchase. Institutional factors may include the types of food establishments and the nutritional content of foods the institution makes available for purchase. Finally, public policy factors may include requirements for nutrition labeling at the point of purchase to inform individuals about the nutrition content of foods they are considering for purchase.

At the individual level, there is evidence that many adults underestimate the calorie content of fast food items.[16,17] In particular, research has consistently shown that underestimation is most pronounced for higher calorie foods and larger meals.[18–20] Additionally, whites,[20] younger individuals,[21] those with lower socioeconomic status,[20,21] and men[18,22] have been shown to be less knowledgeable about nutrition and caloric content of foods than their counterparts. It is less clear to what degree college students, many of whom are making their own food decisions for the first time, are able to accurately estimate the calorie content of food items that are readily available to them within their campus environments.

Several studies have examined whether the provision of nutrition information, including calories, will result in consumers making healthier food choices.[23] Burton et al. found that expectancy disconfirmation theory predicted a customer's future food purchasing behavior.[17] Expectancy disconfirmation theory is widely used in consumer research to predict product satisfaction.[24] The theory includes the constructs of expectations, performance, disconfirmation, and satisfaction. Overall, if a person initially expects a product performance that takes place, this is confirmation that leads to satisfaction. Positive confirmation is when the product exceeds expectations and also leads to satisfaction. Negative disconfirmation is when the product performs more poorly than expected, and this leads to a decrease in satisfaction.[24] Applying this theory to caloric knowledge, confirmation is the accurate estimation of caloric content, positive confirmation is the overestimation of caloric content, and negative disconfirmation is underestimation of caloric content. Burton et al.'s study of 363 adults who frequently ate at fast food restaurants revealed that when nutritional information was provided and calories were higher than expected (negative disconfirmation), intentions to purchase the item decreased.[31] Gerend conducted a study to examine the impact of calorie information, specifically focused on college students.[25] The author reported that when undergraduate college students were provided with calorie information on menus, female students ordered 146 calories less per meal, but there was no change for males.[25] Other researchers have found similar results with regard to the use of nutrition information by females.[22,26] It is less clear whether there are differences in the influence of nutrition and calorie information based on other characteristics within the college population.

There is a need for additional information on the accuracy of college students' calorie estimation for fast food items that are commonly consumed on campus and whether student characteristics or baseline calorie estimation relates to their use of caloric information in food purchasing decisions. An understanding of the thought process that college students use when making food choices, including whether the provision of calorie information impacts upon those choices, can inform the development of campus interventions, including point-of-purchase menu labeling, to promote healthy food choices for this population.

PURPOSE

The purpose of this study was to determine (1) to what extent are college students knowledgeable about the caloric content of the most commonly purchased fast food items on campus; (2) whether caloric knowledge differs based on demographic characteristics, weight status, weight loss intention, or exercise status; (3) whether the provision of accurate caloric information impacts future purchasing intentions for those foods; and (4) whether changes in purchasing intentions differ based on accuracy of initial caloric knowledge, demographic characteristics, weight status, weight loss intention, or exercise status.

METHODS

Study Design

This study used a single-group pretest–posttest experimental design. Baseline data were collected from college

students on their knowledge about the caloric content of food items sold in campus fast food establishments and their intentions to consume those food items in the future. A brief intervention (the disclosure of accurate nutrition information for that food item) was then delivered through an online survey tool and students were posttested on their intention to consume that food item in the future. Information on demographic characteristics, weight status, weight loss intention, and exercise status was also collected and correlated with caloric knowledge and changes in purchasing intentions.

Sampling and Recruitment

The study population consisted of college students who were enrolled in randomly selected courses at a 4-year public university in New England. Participants were required to be enrolled as a sophomore, junior, or senior undergraduate student and were present in class on the date of recruitment. Freshmen were excluded because these students were new to the campus environment and many were using a meal plan that encouraged eating in a university dining hall rather than in fast food establishments.

A representative sample was obtained by initially identifying high enrollment courses (greater than 16 students) that were required for all students at the university. Specific courses were then randomly selected for participation. Instructors were contacted by e-mail to obtain permission for the researcher to attend class and recruit potential study participants. In total, 453 students were invited to participate and 223 students completed the survey (49%). After excluding students who did not qualify or provided incomplete data, the number of students who participated in the survey was 201. Power analysis calculations indicated that a minimum of 200 students were needed for the type of data analysis that was planned for this study.

Consent from course instructors was obtained prior to participant recruitment, which included a 5-minute in-class appeal, the distribution of a handout to students with a link to the survey, and a scannable Quick Response (QR) code to take the survey on their smartphone. Students who completed the survey were offered entry into an iTunes raffle ($50) as an incentive for participation.

Approval was obtained from the university's institutional review board prior to the start of this research study.

Instrumentation

An online survey instrument was designed to collect pretest information, provide the intervention (accurate calorie information for the selected food item), and collect posttest information. The instrument measured caloric knowledge for specific food items, intention to consume that food item in the future, demographics, height and weight (body mass index, BMI), perception of weight status, weight loss intention, and exercise status. The instrument also delivered the intervention, which was a picture of the nutrition label containing accurate caloric information for their selected food item.

In order to ensure that the foods included in this online survey were familiar to the target population, the researcher contacted the foodservices manager and obtained a list of the most commonly purchased fast food items on campus. The accuracy of this list was then verified during interviews with foodservice workers and staff, and the top 7 items were selected for inclusion in the questionnaire. Accurate calorie information and pictures of all food items were obtained from the food distributor's website.

The online survey tool presented each student with one question at a time. The student was first presented with pictures and titles for 7 popular fast food items and asked to "select one food item that you would be willing to consume." Once an item was selected, the student was asked, "Do you intend to consume this food in the future?"with answer choices of *not very likely*, *not likely*, *likely*, or *very likely*. The student was then provided with a blank textbox and asked to "make a best guess about the total number of calories" in his or her selected food item. After entering a number, the student was presented with the intervention, which was a picture of the nutrition label containing the accurate number of calories for his or her selected food item. In order to confirm that the intervention had been delivered, the student was then asked to enter into a textbox the number of calories that appeared on the nutrition label. The student was then presented with the same question he or she had answered previously: "After seeing the item's nutritional information, do you intend to consume this food in the future?" with answer choices of *not very likely*, *not likely*, *likely*, or *very likely*. Content validity for the survey was established through expert review and feedback from students who were comparable to the study sample. Reliability for the pretest questions was established through a test–retest with 53 participants who were comparable to the study sample (alpha coefficient = .75). At the time of this study, the nutritional information for survey food items was available online but was not posted on menu boards in fast food establishments on campus.

The online survey also measured height (in feet and inches) and weight (in pounds) by asking students to enter those numbers into textboxes. Perceived weight status was measured with the question: "How would you describe your weight?" with answer choices of *underweight*, *about the right weight*, *slightly overweight*, or *very overweight*. Weight loss intention was measured with the question: "Which of the following best describes your intentions with regard to your body weight?" with answer choices of "I am trying to lose weight," "I am trying to maintain my current weight," or "I am trying to gain weight." Exercise status was measured with the question: "In the past 30 days, about how many hours per week on average did you spend exercising

(include any exercise of moderate or higher intensity. Moderate intensity is roughly the equivalent of brisk walking or bicycling)." Answer choices were "less than 1," "1–2," "3–4," and "5 or more."

Analysis

Data were analyzed using STATA version 12.[27] Descriptive statistics were calculated to assess undergraduate survey respondents' caloric knowledge of the food item they selected for the survey. For cases where sample sizes were small, variable categories were collapsed. All racial groups other than white were collapsed into non-white. Students' entries were then analyzed by subtracting the known caloric content of the food item to obtain a deviation score. These deviation scores were then grouped as underestimating, accurately estimating, or overestimating the calories in the item. The range that was coded as accurate for this knowledge score was within a 12.5% over- or underestimation from the actual calories for the food item.

Chi-square tests were conducted to evaluate whether students' caloric knowledge of their selected food item was related to gender, age, academic status, residence, body mass index, perceived weight status, weight loss intention, or exercise status. Chi-square tests were also used to compare underestimators with accurate/overestimators on their change in intention to purchase the item after being presented with accurate caloric information.

RESULTS

Description of the Sample

Table 1 illustrates the descriptive characteristics of the sample of undergraduate students who participated in this survey ($n = 201$). The gender and race profile for the sample was in agreement with the demographics for undergraduate students at this university. The majority of the sample was female (69.1%) and white (75.6%). The largest proportion of survey respondents were traditional undergraduate ages, between 18 and 22 years old (79.1%), and distributed between sophomores (30.9%), juniors (42.3%), and seniors (26.9%). Less than half (43.3%) of survey respondents lived off campus with a parent.

The majority of students self-reported a BMI that was within a healthy range (less than 25), but two-fifths (40.6%) were overweight or obese. This was in agreement with the proportion of students who perceived themselves as overweight (40.0%). Approximately half (50.6%) of students reported being on a diet to lose weight and slightly more than half (51.7%) reported doing 30 minutes of moderate exercise 3 days per week or more.

TABLE 1
Characteristics of the Sample ($N = 201$)[a]

Characteristics	f	*(%)*	*Mean*	*SD*
Gender				
Male	62	30.9		
Female	139	69.1		
Race				
White	152	75.6		
Non-white	49	24.4		
Age (years)			21.9	4.4
18–22 years	159	79.1		
23–50 years	42	20.9		
Academic status				
Sophomore	62	30.8		
Junior	85	42.3		
Senior	54	26.9		
Residence				
On campus	59	29.3		
Off campus independently	55	27.4		
Off campus with parents	87	43.3		
Weight status (BMI)			25.2	5.0
Not overweight or obese	107	59.4		
Overweight or obese	73	40.6		
Perceived weight status				
Not overweight	108	60.0		
Overweight	72	40.0		
Weight loss intentions				
Trying to lose weight	91	50.6		
Not trying to lose weight	89	49.4		
Moderate exercise status				
$\geq$ 3 hours per week	93	51.7		
$<$ 3 hours per week	87	48.3		

[a] BMI indicates body mass index. Some questions were not answered by all students.

Caloric Knowledge Based on Participant Characteristics

As part of this survey methodology, participants were presented with pictures and descriptions of 7 food items and asked to select an item they "would be willing to consume" and to estimate the caloric content of their selected food item. Only 21% of students accurately estimated caloric content within $\pm$12.5%; 55% underestimated caloric content and 24% overestimated the caloric content. The average calorie estimation was an underestimation of 111 calories out of an average calorie value of 504 across all food items (estimation range = -610 to $+960$ calories). Caloric values for the foods included in this survey and corresponding estimates for caloric content are provided in Table 2.

For the purpose of further analysis, accurate and overestimators were combined so they could be compared with those who underestimated caloric content of their selected food item. These results are provided in Table 3. Chi-square tests revealed that weight status (BMI; $P = .018$), was significantly related to caloric knowledge. When compared with their counterparts, a significantly higher percentage of students who were not overweight (BMI $\leq$ 25) underestimated the caloric content of their

TABLE 2
Food Items and Estimation Values ($N = 183$)

Food Item	n	*Calories (KCal)*	*Underestimation Range*	*Accurate and Overestimation Range*
Turkey sandwich	56	490	−470 to −61.26	−61.25 to 410
Pizza	17	510	−490 to −63.76	−63.75 to 690
Chili cheese hot dog	4	494	−474 to −61.76	−61.75 to 506
Bagel with cream cheese	33	410	−387 to −51.26	−51.25 to 290
Chicken caesar wrap	37	430	−427 to −53.76	−53.75 to 450
Bagel with sausage, egg, and cheese	19	690	−610 to −86.26	−86.25 to 960
Blueberry muffin	17	504	−502 to −63.01	−63.00 to 246

selected food item. No significant differences were found in caloric knowledge with respect to gender, academic status, age, residence, perceived weight status, current weight loss intentions, or exercise status. In addition, due to the small sample size for some racial groups, data for this study were collapsed into white and non-white groupings, making it difficult to draw any meaningful conclusions about differences based on race. For this reason, differences in caloric knowledge or purchasing intention changes based on racial category were not analyzed.

Change in Purchasing Intention With the Provision of Nutrition Information

Respondents were initially asked to indicate the likelihood that they would purchase their selected food item in the future, presented with accurate caloric information for that food item, and then asked to again report their likelihood of purchasing that item in the future. Students who had initially underestimated the caloric content of their selected food item were significantly more likely to report a decrease in likelihood of purchasing that food item in the future compared to those who had accurately or overestimated caloric content ($P = .035$). These results are provided in Table 3.

TABLE 3
Differences in Caloric Knowledge Based on Participant Characteristics ($N = 201$)[a]

	Underestimate		*Accurate or Overestimate*				
Characteristic	f	%	f	%	χ^2	*df*	P *Value*
Gender							
Male	39	62.9	23	37.1	2.14	1	.14
Female	72	51.8	67	48.2			
Academic status							
Sophomore	39	62.9	23	37.1	4.07	2	.13
Junior	48	56.5	37	43.5			
Senior	24	44.4	30	55.6			
Age (years)							
18–22 years	93	58.5	66	41.5	3.28	1	.07
23–50 years	18	42.9	24	57.1			
Residence							
On campus	33	55.9	26	44.1	0.19	2	.91
Off campus independently	29	52.7	26	47.3			
Off campus with parents	49	56.3	38	43.7			
Weight status (BMI)							
Not overweight or obese	66	61.7	41	38.3	4.76	1	.03*
Overweight or obese	33	45.2	40	54.8			
Perceived weight status							
Not overweight	65	60.2	43	39.8	2.93	1	.09
Overweight	34	47.2	38	52.8			
Weight loss intentions							
Trying to lose weight	45	49.5	46	50.5	2.29	1	.13
Not trying to lose weight	54	60.7	35	39.3			
Moderate exercise status							
≥ 3 hours per week	48	55.2	39	44.8	0.01	1	.96
< 3 hours per week	51	54.8	42	45.2			
Change in purchasing intention							
Decrease	54	63.5	31	36.5	4.46	1	.04*
No change or increase	47	48.0	51	52.0			

*$P \leq .05$.
[a] BMI indicates body mass index.

TABLE 4
Change in Purchasing Intention by Caloric Knowledge and Student Characteristics ($N = 183$)[a]

	Change in Purchasing Intention									
	Decrease				*No Change or Increase*				*Pearson Chi-Square Test*	
	Underestimate		*Accurate or Overestimate*		*Underestimate*		*Accurate or Overestimate*			
Caloric Knowledge	f	%	f	%	f	%	f	%	χ^2	P
Gender										
Males	18	66.7	9	33.3	21	63.6	12	36.4	0.06	.81
Females	36	62.1	22	37.9	26	40.0	39	60.0	5.97	.02*
Academic status										
Sophomore	18	66.7	9	33.3	16	57.1	12	42.9	0.53	.47
Junior	27	67.5	13	32.5	18	47.4	20	52.6	3.24	.07
Senior	9	50.0	9	50.0	13	40.6	19	59.4	0.41	.52
Age (years)										
18–22 years	46	66.7	23	33.3	38	50.7	37	49.3	3.79	.05*
23–50 years	8	50.0	8	50.0	9	39.1	14	60.9	0.45	.50
Residence										
On campus	16	66.7	8	33.3	10	40.0	15	60.0	3.50	.06
Off campus independently	14	60.9	9	39.1	14	48.3	15	51.7	0.82	.37
Off campus with parents	24	51.1	23	48.9	14	40.0	21	60.0	0.99	.32
Weight status (BMI)										
Not overweight or obese	35	71.4	14	28.6	30	50.8	29	49.1	4.73	.30
Overweight or obese	18	51.4	17	48.6	16	43.2	21	56.8	0.48	.49
Perceived weight status										
Not overweight	35	71.4	14	28.6	30	50.9	29	49.2	4.73	.03*
Overweight	18	51.4	17	48.6	16	43.2	21	56.8	0.48	.49
Weight loss intentions										
Trying to lose weight	27	60.0	18	40.0	18	39.1	28	60.9	3.96	.05*
Not trying to lose weight	26	66.7	13	33.3	28	56.0	22	44.0	1.05	.31
Moderate exercise status										
≥ 3 hours per week	29	64.4	16	35.6	22	45.8	26	54.2	3.25	.07
< 3 hours per week	24	61.5	15	38.5	24	50.0	24	50.0	1.16	.28

*$P \leq .05$.
[a] BMI indicates body mass index.

Change in Purchasing Intention Based on Participant Characteristics

After observing that underestimators of caloric content were significantly more likely to decrease their food purchasing intentions upon being presented with accurate nutrition information, this relationship was further analyzed based on student characteristics. The subgroups who were significantly more likely to decrease their food purchasing intentions after initially underestimating caloric content included females ($P = .015$), traditional-aged college students ($P = .052$), those who perceived their weight status as not overweight ($P = .030$), and those who were trying to lose weight ($P = .046$). These results are provided in Table 4.

DISCUSSION

Many weight loss and weight management interventions based on CBT encourage individuals to set specific goals for daily caloric intake and caloric expenditure.[11] An important finding in this study was that most students were not knowledgeable about the caloric content of the most popular food items that were sold in fast food establishments on their campus, and a majority underestimated the caloric content of these items. This finding is consistent with research studies in other populations, which have shown that fast food consumers tend to underestimate the caloric content of the food items they purchase.[17,28–30] Interestingly, in this study of college students, individuals who were not overweight or obese were more likely than their counterparts to underestimate caloric content. These findings were somewhat unexpected and bring into question some assumptions about which students are attentive to nutrition labels and which students might benefit most from nutrition education and easy access to information about the caloric content of food items at the point of purchase.

This study also used expectancy disconfirmation theory[24] as a framework to test whether initial expectations about caloric content in fast food items were associated with changes in intention to purchase those items in the future and found that after being provided with accurate caloric information for their chosen food item, those who initially

underestimated the caloric content (disconfirmation) were more likely to report a decrease in intention to purchase that item in the future. These results are similar to Burton et al.'s study, in which overestimations of actual caloric content also predicted a decrease in purchasing intention.[31] These findings support the use of nutrition education and point-of-purchase labeling as effective weight loss and weight management strategies in college settings. Health education courses are ideal settings for college students to gain nutrition knowledge and build cognitive skills for behavior modification.

It is increasingly important for university health educators to be creative with their delivery of nutrition information and seek opportunities for delivery in different types of settings such as residence halls, living–learning communities, clubs, and organizations. Health educators can also strategically partner with other professors to integrate content into other required courses. Nutrition information can serve as ideal content for many math and science courses, and nutrition policy issues, such as food labeling, can serve as content for courses in other disciplines. Additionally, health educators should explore creative modes of delivery, including use of technology, text messaging, and a wide variety of campus media outlets and locations for visual displays.

One unique aspect of this study was the examination of which student underestimators were more likely to change their purchasing intention after receiving accurate nutrition information. The finding that female students were more likely to change purchasing intention was consistent with other studies. Morse and Driskell found females to be more concerned with nutritional information and have greater interest in reading nutrition labels.[22] Misra also found that females use nutrition labels at higher frequencies compared to males.[32] Other studies have found that when calories were posted, females ordered significantly fewer calories than males[25,33] and placed greater personal importance and relevance on food decisions than males.[26] Further research is needed to gain insight about why males are less likely to use nutrition information and which strategies would be effective at motivating males to lower their calorie intake. According to the most recent data from the American College Health Association–National College Health Assessment, rates of overweight and obesity are higher among undergraduate college males compared to females.[2] In their survey of over 96 000 undergraduate students in Spring 2013, 51.7% of males self-reported heights and weights that classified their BMI as overweight or obese, compared to 30.4% of females.[2] This disparity in the health status of college-aged males has gone largely unnoticed by researchers and merits a focused research agenda that may result in new theoretical frameworks upon which tailored interventions, programs, and resources may be developed.

It was not surprising that underestimators in this study who were trying to lose weight were more likely than their counterparts to change their purchasing intention after being provided with accurate nutrition information. Hoefkens and colleagues also found that dieters were more interested in reading nutrition labels than nondieters.[34] It was somewhat surprising, however, that underestimators who perceived their weight status as healthy were more likely to change purchasing intention than underestimators who perceived themselves to be overweight. A previous study investigating nutritional label use for fast food items among a younger group of adolescents had found that overweight or obese adolescents were more likely to use calorie information in fast food purchasing decisions.[35] These results demonstrate that many college-aged adults are concerned about personal weight management and wish to avoid excessive caloric consumption regardless of whether they are currently overweight. Easy access to calorie information for fast food items can be an effective prevention strategy and would empower all students to make informed decisions about whether to consume high-calorie items at fast food establishments.

TRANSLATION TO HEALTH EDUCATION PRACTICE

This study produced several findings that can inform health education practice. Utilizing the social ecological model as a framework,[15] health educators can intervene at the intrapersonal level to increase college students' knowledge about the calorie content of popular food items that are sold on campus—especially those fast food items that are high in calories. Health educators should not assume that students are able to identify high-calorie items. This study demonstrated that a majority of college students underestimated the calorie content of fast foods and were therefore vulnerable to purchasing high-calorie items without the intention of doing so. Health educators are also reminded that it is important to provide nutrition information to all students and not just those who are overweight. In this study, students who were at a healthy weight were actually less knowledgeable about nutrition and more likely to underestimate calories in fast food items than their overweight peers. As rates of obesity in the United States have continued to rise among children and young adults, nutrition education has increasingly focused on weight control. Poor eating habits take time to develop into subsequent health problems and, therefore, young adults who are not currently overweight may need the assistance of a health educator to understand the value of healthy eating during their college years. Health educators should also continue to advocate for the inclusion of nutrition education in the school curriculum and engage in creative efforts to deliver nutrition information to the college population. Health educators should consider partnering with professors from other courses, delivering information in residence halls

and other non-classroom settings, and using student input to identify the most effective methods for reaching college students. College students should be partners in these efforts because they are most knowledgeable about how to tailor and present information that will appeal to their peers.

Using the social ecological model as a framework,[15] this study also informs health educators about institutional and policy-level factors that impact college students' nutritional behaviors. The proliferation of fast food establishments on college campuses has created an environment where high-calorie items are readily available to students. As lease agreements expire on college campuses and new contracts are negotiated with food vendors, health educators must advocate for inclusion of vendors who offer healthy food items and menu options that have moderate or low calorie levels. Additionally, health educators should engage in advocacy efforts at the policy level to increase point-of-purchase food labeling in fast food establishments on campus. When possible, formal policy efforts at the state and local levels can result in mandatory labeling at the point of purchase. Although nutritional information was available online for fast food items in this study, the majority of students were unaware of the caloric content of their selected food item. Prominent point-of-purchase calorie labeling is essential for the dissemination of this information. A recent survey among college students found that 98% of students found nutritional information for foods at the point of purchase helpful for making decisions about what to eat.[36] Advocacy efforts at the state and local levels are also ideal cocurricular activities that engage students, impact their health, and reinforce academic content. If policy change at the local and state levels is not possible, health educators should develop informal methods for distributing or posting nutrition information for foods that are sold in fast food establishments on campus. Most fast food vendors have nutrition and calorie information readily available through their company's website. The development of targeted information campaigns to increase students' knowledge about commonly purchased fast food items on their campus can empower those students who are interested in avoiding high-calorie items. Additionally, as caloric knowledge about fast food items gets diffused into the student population there will be increased opportunities for interpersonal-level factors to influence students' nutritional behaviors. Peers who have been exposed to calorie information and increased their knowledge may serve as sources of information for others or discourage peers from purchasing high-calorie food items. These campaigns will be most effective if they are developed using best practices in the health education profession,[37] including the integration of student stakeholders into all stages of the planning and implementation process.

Finally, traditional public health programs have focused on educating overweight individuals to avoid foods that are caloric dense and nutritionally deficient. In this study, those who were overweight or obese were more knowledgeable than their healthy weight peers about the caloric content of fast food items, but overweight students who initially underestimated caloric content were less likely to change their purchasing intention when provided with accurate calorie information. Given these results, it is evident that education about nutrition and caloric content cannot be the only strategy health educators use to tackle the obesity epidemic among college students. Further research is needed to determine how students use and process calorie information and under what circumstances that information does or does not influence their health behaviors. Special attention should be given to male students and those who are overweight. Qualitative research methods can uniquely inform health educators about the knowledge, beliefs, attitudes, and behaviors of specific groups of students within the campus environment.[38] These research methods can also identify needs and capacities that can serve as a foundation to the development of effective health promotion interventions.

Strengths and Limitations

Strengths of this study include random selection of research participants and use of a survey instrument that was tailored to the target population and pilot tested for reliability. This study is limited by the type of research design, instrumentation, and study population used. The research design incorporated a combination of experimental methods and chi-square analysis. For chi-square results, differences between groups should not be interpreted as causal relationships. This instrument measured purchasing intention rather than actual purchasing behavior and required students to self-report information. Measures of intention may not accurately predict changes in actual behavior. Additionally, this instrument relied on self-reported measures for the variables of height and weight that were used to calculate BMI. Finally, data were collected at one public university in New England and, therefore, these results may not be generalizable to the general population of college students or other adults in this age group.

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