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Observed sex differences in fast-food consumption and nutrition self-assessments and beliefs of college students

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Abstract

Americans frequently eat fast foods, but do college students? The objective was to determine the influence of sex on fast-food consumption and nutrition self-assessments and beliefs of a group of college students. The hypothesis was that some sex differences would be observed. Volunteers, 101 men and 158 women, 19 to 24 years of age, enrolled at a Midwestern university served as subjects. The subjects completed a 12-item written questionnaire. Five and seven percent of the students typically ate lunch and dinner, respectively, at a fast-food restaurant. The predominant reasons given for eating at fast-food restaurants were "limited time," "enjoy taste," "eat with family/friends," and "inexpensive and economical." A larger ($P = .0592$) percentage of men than women reported eating at fast-food restaurants because they thought these restaurants were "inexpensive and economical." Most of the subjects reported eating at fast-food restaurants 1 to 3 times weekly. The frequency of eating at fast-food restaurants was significantly different for men than for women ($P < .01$) as was the response distribution for considering the energy content of items on a fast-food menu when making their selections ($P < .0001$). Body mass indices of men were significantly higher ($P < .0001$) than those of women. A significantly higher ($P < .0001$) percentage of women than men strongly agreed with the statement that "the nutrition content of food is important to me." Several sex differences were observed in the fast-food consumption and nutrition beliefs of these college students.

Keywords: Fast foods; Nutrition self-assessments; Nutrition beliefs; College students; Sex
Abbreviations: BMIs, body mass indices; NCHA, National College Health Assessment.

1. Introduction

A quarter of US adults eat fast food every day [1]. In 2004, fast-food restaurants generated annual sales in excess of 242.5 billion in the United States and were in more than 233,000 locations [2]. Fast-food restaurants are those in which one can order, purchase, and receive the food in about 10 minutes [3]; this includes traditional fast-food restaurants where customers order and receive food at counters and drive-in locations as well as fast/casual restaurants where customers order at counters and their food is delivered to the table [4]. The National Restaurant Association has reported that 30% of US consumers agreed that meals at fast-food restaurants are essential to the way they live [5]. College students frequently consume fast foods [6,7]. Eating at fast-food restaurants appears to be part of the lifestyles of college students [8].

A few studies have been conducted on reasons why college students eat at fast-food restaurants. These reasons include menu choices, cost, convenience [6,8,9], taste, cost [6,8], socializing with friends [8,10], a chance to get out [10], advertisement, lack of cooking skills, and location [8]. Reports exist that some of the predominant reasons given by college men for their eating patterns may be different than those of college women [8-10].

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College students have been reported to eat meals at fast-food restaurants 6 to 8 times weekly [6]. Therefore, foods eaten at fast-food restaurants do substantially contribute to the nutrient intakes of college students. Dietary intakes of most college students do not meet recommendations for most of the food groups [11]. The typical college student diet is high in fat [12,13] and sodium and low in fruits and vegetables [12,14]. College men have been reported to consume more high-energy and high-fat foods than women [13]. Obesity has also been associated with fast-food consumption [15], although some items available at most fast-food restaurants are not high in energy. These behaviors are of concern to health professionals because dietary knowledge, beliefs, and behaviors that are developed and exhibited during college may carry over into adulthood and influence future health status [11]. College students will soon enter the age range of high chronic disease burden [16].

The objective of this study was to determine the influence of sex on fast-food consumption and nutrition self-assessments and beliefs of a group of college students at a large Midwestern university. The hypothesis was that differences would be observed by sex in some but not all variables.

2. Methods and materials

2.1. Subjects

The study was approved by the university's institutional review board for research involving humans. Volunteers, 19 to 24 years of age, were recruited from the Healthy Lifestyles course, 2 sections, at a large Midwestern university during the 14th week of Spring Semester 2006. Healthy Lifestyles is one of the courses that undergraduates can select to meet their humanities requirement. The course has no prerequisites. After the students signed informed consent forms, they completed questionnaires. Each subject's classification and college were obtained from class rosters and compared with that of the university's undergraduate population [17].

2.2. Questionnaire development

A 2-page, 12-item questionnaire was developed. The definition of fast-food restaurants was included on the questionnaire. Previously published findings [9,10,18-21] were used in developing 11 of these items. The questionnaire assessed current living situation (on-campus, with as well as without campus meal pass, Greek house, off-campus housing with family, off-campus housing, with friends or living alone); where respondent typically ate meals (fast food, university cafeteria, home, sit-down restaurant, dormitory room, or other); individuals with whom the respondent typically ate meals (family member(s), friend(s), roommate(s), coworker(s), significant other, alone, or other); sources of nutrition knowledge (family, friends, classes, magazines/newspapers, books, physician, registered dietitian, other health professional, television, instinct, or other, selecting all that applied); reasons for eating at fast-food restaurants ("never eat fast food," "inexpensive and economical," "limited time," "enjoy taste," "eat with friends/family," or "other," selecting all that applied); 2 favorite aspects of fast-food restaurants ("free soda refills from most," "drive thru option," "value meals," "the taste of the food," "the variety of menu items," "easier than cooking for self," "inexpensive," "fast and convenient," or "other"); frequency of eating at a fast-food restaurant (0, 1-3, 4-6, or 7+ times weekly); and if they typically considered the energy content of items on a fast-food menu when making their selections ("I do not eat fast food," "no, I order what looks good," "yes, but I order what looks good," "yes, I order what I think to be my healthiest option").

Respondents provided self-reported anthropometric measurements. Body mass indices (BMIs) were calculated as the weight in kilograms divided by the square of height in meters [22]. The BMIs of the subjects were compared with the federal standards for BMI categorization [23]: less than 18.5 = underweight, 18.5 to 24.9 = normal, 25.0 to 29.9 = overweight, and 30.0 and greater = obese.

In addition, respondents indicated whether they strongly agreed, somewhat agreed, were neutral, somewhat disagreed, or strongly disagreed (Likert scale) with the following 10 nutrition self-assessment and belief statements: "I eat a healthy diet," "I eat too many foods containing processed carbohydrates," "I eat too much sugar in my diet," "the nutritional content of food is important to me" [21], "I eat too much fat in my diet," "I eat too much saturated fat in my diet," "I do not eat enough fruits and vegetables," "I eat too many foods containing trans fats," "the eating of fast food can be incorporated into a healthy diet," and "the positive aspects of eating fast food outweigh the negative aspects."

The validity and reliability of the developed questionnaire were determined [24]. The questionnaire was validated for content by 10 university health professionals, most of whom had expertise in nutrition. Ten students pilot-tested the survey to clarify language and response options. Twelve subjects completed the questionnaire a second time after 1.5 weeks, and their responses were the same 84% of the time.

2.3. Statistical analyses

All data, except that from anthropometric measurements, were evaluated by sex using χ^2 analyses [25] using SAS version 9.1 software (SAS, Inc, Cary, NC) and are presented as percentages of subjects. Anthropometric data were analyzed by sex using general linear models [25] and are presented as means ± SDs. Differences were considered significant at $P < .05$.

3. Results

Questionnaires were completed by 259 undergraduate students. These subjects included 101 (39%) men and 158 women (61%), with 88% of eligible students volunteering as

subjects. The percentage of women participating in this study was larger than the percentage of women (48%) enrolled in the university's undergraduate program [17]. The percentages of subjects from most of the university's colleges were similar to those of the university's undergraduates, except for having no students from the College of Engineering and Technology. Forty-six percent of subjects were freshmen, 26% sophomores, 18% juniors, and 10% seniors.

3.1. Eating practices of subjects

No significant differences by sex were observed with respect to the subjects' eating practices. Forty-nine percent of the subjects reported living on-campus in a residence hall with a university cafeteria meal pass, with the next largest percentage (21%) reporting living in off-campus housing with friend(s), 12% in Greek housing, 9% off-campus with parents/family, 5% on-campus residence hall without meal pass, and 4% off-campus living alone.

The places where students reported typically eating their meals are given in Table 1. Forty-four percent of students indicated typically eating breakfast at home and 43% at a university cafeteria. Only one student reported typically eating breakfast at a fast-food restaurant. Fifty percent of subjects reported typically eating lunch at a university cafeteria, 32% at home, and 7% at a fast-food restaurant. For dinner, 47% of subjects typically ate at a university cafeteria and 39% at home, whereas 5% typically ate at a fast-food restaurant.

Sixty-six percent of students typically ate breakfast alone, 23% with friends, 5% with roommates, 3% with significant others, 2% with family members, and 1% with coworkers. The individuals that students typically ate lunch with were as follows: 47% with friends, 36% alone, 11% with roommates, 3% with significant others, 2% with family members, and 1% with coworkers. The individuals that students reported typically eating dinner with were as follows: 55% with friends, 16% alone, 12% with roommates, 10% with significant others, 6% with family members, and 1% with coworkers.

Table 1
Places where students reported typically eating their meals by sex (n = 259)

Place	Breakfast [a]		Lunch [b]		Dinner [c]	
	M	F	M	F	M	F
	(% of subjects)					
Fast food	1	0	8	6	4	5
University cafeteria	43	43	50	50	48	46
Home	47	42	34	31	39	38
Sit-down restaurant	0	0	0	1	3	5
Dormitory room	9	10	5	4	4	4
Other [d]	0	5	3	8	2	2

No significant differences in responses were observed by sex as determined by χ^2 test. M indicates male; F, female.

[a] Twenty-one students reported not typically eating breakfast.

[b] Seven students reported not typically eating lunch.

[c] Twelve students reported not typically eating dinner.

[d] Although the type of other place was requested, most of these students did not write in the place.

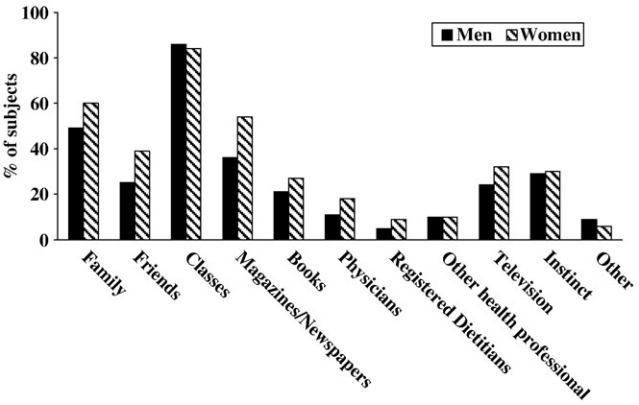

Fig. 1. Where students reported obtaining most of their nutrition knowledge by sex (n = 259). Students could select all that applied. A higher percentage (P = .0666) of women than men indicated family. A significantly higher percentage of women than men indicated friends (P = .0209) and magazines/newspapers (P = .0031). Sources listed under other included 8 subjects indicating internet, 6 coaches/sports, 2 from reading food labels, and 2 did not provide this information.

3.2. Sources of nutrition knowledge

The sources where students reported getting most of their nutrition knowledge by sex are given in Fig. 1; students could check all sources that applied. A significantly larger (P = .0209) percentage of women than men obtained most of their nutrition knowledge from friends (39% vs 25%). A significantly larger (P = .0031) percentage of women than men obtained their nutrition knowledge from magazines and newspapers (54% vs 36%). The percentage of females (60%) reporting receiving their nutrition knowledge from family was higher (P = .0666) than that for men (49%). There were 18 responses in the "other" category (8, internet; 6, coaches/sports; 2, food labels; and 2 did not provide this information).

3.3. Reasons given for consuming fast foods

The reasons given by the students for eating at fast-food restaurants are given by sex in Fig. 2A; students could select all that applied. More men than women (P = .0592) reported eating at fast-food restaurants because they were "inexpensive and economical" (42% vs 30%). More than half of the subjects reported choosing a fast-food restaurant because of "limited time," with no significance by sex. The second most popular reason for eating fast food was "enjoyed the taste." A higher percentage (P = .0992) of women (48%) than men (38%) indicated that they ate at fast-food restaurants so they could "eat with family and friends." Seven percent of males and 12% of females reported that they "never eat fast food."

No statistically significant differences by sex were observed with regard to subjects' favorite aspects of eating at fast-food restaurants. Seventy-two percent of subjects chose the option "fast and convenient" as 1 of their 2 favorite

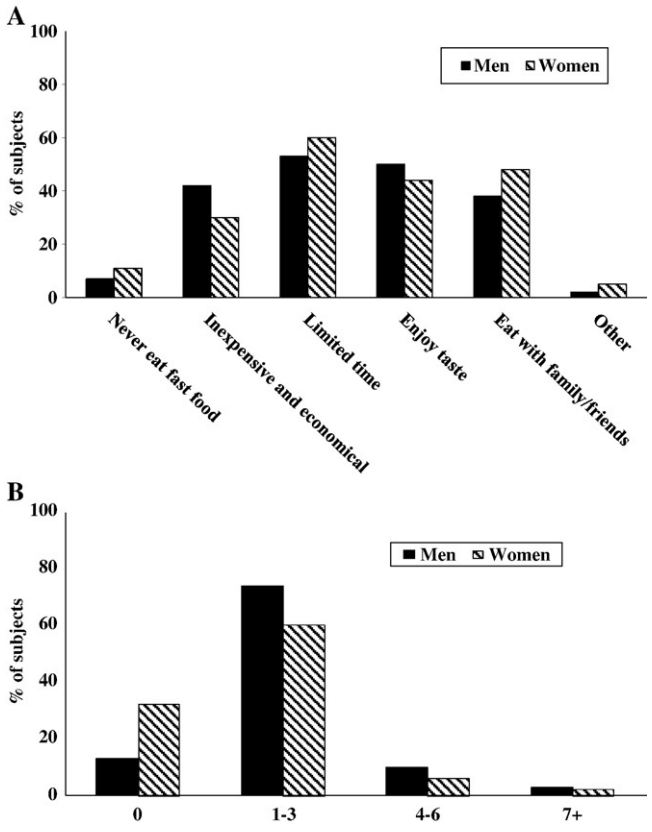

Fig. 2. Reasons given by and number of times weekly students reported typically eating at fast-food restaurants by sex (n = 259). (A) Reasons reported by students by sex for typically eating at fast-food restaurants. Students could check all that applied. A larger percentage ($P = .0592$) of men than women indicated because fast-food restaurants were "inexpensive and economical," whereas a larger percentage ($P = .0992$) of women than men indicated eating there so they could "eat with family or friends." (B) Frequency (times/wk) of students by sex typically eating at fast-food restaurants. The responses given by men were significantly different ($P = .0074$) than those of women.

aspects of fast-food restaurants, whereas 40% indicated that it was "easier than cooking for self." Other choices selected were "enjoy taste," 30%; "inexpensive," 25%; "drive thru option," 20%; "free soda refills from most," 6%; "value meals," 4%; "variety of menu items," 2%; and "other" (did not specify what other), 1%.

The distribution of responses by males was significantly different ($P = .0074$) than those of females with regard to the number of times weekly these students typically ate at fast-food restaurants (Fig. 2B), with 74% of men and 60% of women indicating 1 to 3 times weekly. Thirty-three percent of women and 13% of men reported typically not dining at a fast-food restaurant.

The distribution of responses by sex was significantly different ($P < .0001$) with regard to typically considering the energy content of items on a fast-food menu when making their selections. Fifty-eight percent of males and 27% of females selected the response "No, I order what looks good," whereas 24% of males and 31% of females selected the response "Yes, but I order what looks good," 13% of males and 32% of females selected the response "I order what I think to be my healthiest option," and 5% of males and 10% of females indicated not typically eating at fast-food restaurants.

3.4. Self-reported anthropometric measurements

The height and weight values of men (181.2 ± 6.2 cm, 82.2 ± 12.2 kg) were significantly higher ($P < .0001$) than those of women (167.1 ± 6.9 cm, 62.3 ± 0.4 kg). Body mass indices were significantly different ($P < .0001$) by sex with those for men being 25.0 ± 3.6 and those for women a 22.3 ± 3.0.

3.5. Nutrition self-assessments and beliefs

Only one significant difference ($P < .0001$) in distribution by sex was observed with regard to nutrition self-assessment and belief statements. Fifty-one percent of women and 24% of men strongly agreed with the statement that "the nutrition content of food is important to me." Three quarters of the students either strongly or somewhat agreed with the statement "I eat a healthy diet." More than half strongly or somewhat agreed that they "did not eat enough fruits and vegetables." Fifteen to thirty-six percent of the subjects strongly or somewhat agreed that they ate too many foods containing processed carbohydrates, too much sugar, too much fat, too much saturated fat, and too many foods containing trans fats, whereas around a third of the students reported being neutral with regard to these statements. Almost half the students strongly or somewhat agreed that "the eating of fast food can be incorporated into a healthy diet," whereas two thirds strongly or somewhat disagreed with the statement "the positive aspects of eating fast food outweigh the negative aspects."

4. Discussion

Although fast-food consumption habits of college students have been described, primarily more than a decade ago, this is the first time that this information has been obtained along with their nutrition self-assessments and beliefs with the findings being evaluated by sex. Several differences in these variables were observed by sex.

The college students in the current study reported typically eating breakfast, lunch, and dinner in a university cafeteria 43% to 50% of the time. This is not surprising in that 49% of these subjects purchased cafeteria meal passes, and the meal passes were for 5 or 7 days weekly. Most of the students that purchased a meal pass typically ate in a university cafeteria most of the time, and those not purchasing the pass did not, although they could pay by the meal. The percentages of subjects that reported living in residence halls, Greek housing, and off-campus were similar to those of the university's undergraduate population [17].

The sources of nutrition knowledge of students in the current study were similar to those reported for students by

Davy et al [21] and those reported in the American Dietetic Association's Nutrition and You: Trends survey of adults 18 years and older [26] except that a higher percentage of these students reported receiving most of their knowledge from classes. This is not surprising in that the survey was conducted near the end of the 15-week Healthy Lifestyles course. More of the women than the men in the present study reported obtaining their nutrition knowledge from friends. A prior study [21] indicated that a larger percentage of college women than men had typically obtained their nutrition knowledge from family members and from magazines/newspapers but not from friends. Apparently, today's college women more frequently than men discuss nutrition with their friends.

A significantly larger percentage of college men than women in the current study indicated eating fast foods because they perceived fast foods as being "inexpensive and economical." Also, a larger percentage of women than men, but not significantly, indicated that a reason that they ate at fast-food restaurants was "eat with friends/family." Two previous studies [8,10] reported that significantly larger percentages of college women than men gave the reason eat with friends/family. The top 4 reasons given by the students in the present study for consuming fast foods (they could select as many reasons as applied) were "limited time," "enjoy the taste," "eat with friends/family," and "inexpensive and economical." The top 3 reasons given were in agreement with those of a 2004 study at our university [8]. College students included in a 2003 survey at our university indicated that their food choices, not just at fast-food restaurants, were most influenced by convenience, taste, and cost [6]. Marquis [27] reported that the most important food motivators were convenience, followed by price, pleasure, health, and concern about weight. Apparently, today's college students want to spend little time eating most meals, they tend to like the taste of fast foods, many like to eat with their friends or families, and many think that fast foods are economical.

Most of the college students in the present study reported typically eating at fast-food restaurants 1 to 3 times weekly. Restaurants and Institutions' New American Diner Study [28] indicated that 26% of Generation Y (those 26 years of age or younger) visited a quick-service restaurant once a week. Most college students included in a previous study [8] ate lunch 1 to 2 times weekly and dinner 1 to 2 times weekly at fast-food restaurants.

Because obesity [15] has been associated with fast-food consumption, the BMIs of the subjects were determined. The mean BMI values of subjects in the current study (25.0 for men and 22.3 for women) were similar to those found previously in a recent survey [21] at our university and those of DeBate et al [19]. The mean BMIs for men and women aged 20 to 29 years, according to the National Health and Nutrition Examination Survey 2003-2006 [29], were 27.0 and 26.5, respectively, whereas the mean BMIs for men and women (undergraduate, graduate, professional, adult special, or other students regardless of age) included in the National College Health Assessment (NCHA) Survey in 2005 [30] were 25.1 and 24.4, respectively. Based on BMIs [23] calculated from self-reported data, 58% and 78% of our male and female subjects, respectively, were of normal weight (BMI, 18.5 to <25), 31% and 15% were overweight (BMI, 25 to <30), 10% and 2% were obese (BMI, ≥30), and 1% and 5% were underweight (BMI, <18.5). The percentages of overweight and obese men in the present study were similar to those in the 2005 NCHA national survey [30]. However, the percentage of overweight and obese women in the current study was lower than that of the 2005 NCHA survey (17% vs 27%). However, the percentages of overweight and obese men and women were similar to those observed in a previous survey [21] at our university. Close to 30% of Americans aged 20 to 39 years were reported to be obese according to data from National Health and Nutrition Examination Survey 2005-2006 [31]. Problems are incurred with interpreting the BMIs of individuals who have "built up" their bodies, as is observed frequently in college students. Highly trained athletes often have BMI values indicative of being overweight, although they have increased muscularity rather than increased body fatness [31]. Individuals also frequently under-report their weights and over-report their heights [32].

Americans have widely different ideas about what constitutes a healthy meal [33]. Individuals frequently associate terms such as *fresh*, *moderation*, *calorie counting*, *high in fruits and vegetables* [33], and *low in fat and trans fat* with "healthy eating." Margetts and colleagues [34] classified a healthful diet as one that included more fruits and vegetables, contained less fat, and was balanced. According to a 2006/2007 National Restaurant Association survey [35], 75% of US adults are trying to eat more "healthfully" in restaurants than they did 2 years before. In the current study, around three quarters of the college students indicated that they strongly agreed or somewhat agreed that they ate a healthy diet. In that nutrition is a major topic covered in the Healthy Lifestyles course, these students most likely knew what was meant by a healthy diet.

Close to two thirds of the students in the present study strongly agreed or somewhat agreed that they ate too many foods containing processed carbohydrates and too much sugar in their diets, whereas more than half strongly agreed or somewhat agreed to eating too much fat, saturated fat, and trans fats in their diets. Adults tend to believe that the sugar and fat content of a food make it "fattening" [36]. A third of the students in the present study reported not eating enough fruits and vegetables.

The responses of the men and women in the present study were significantly different with regard to their responses to the statement "the nutritional content of food is important to me." Seventy percent of the men and 85% of the women strongly agreed or somewhat agreed with that statement. These findings are in agreement with reports of women's tendencies to hold stronger beliefs related to nutrition than men [36,37].

Forty-eight percent of the subjects in the current study strongly agreed or somewhat agreed that fast foods can be

incorporated into healthy diets. The consumption of fast food has been reported to be associated with poor diet quality, higher intakes of energy, fat, and saturated fat [38], as well as obesity [15]. Interestingly, this was not the perception of most of the college students included in the present study. Over the last few years, fast-food restaurants started including more foods lower in energy and fats on their menus. It is possible to make healthy choices at fast-food restaurants. However, most subjects in the current study strongly disagreed or somewhat disagreed with the statement "the positive aspects of eating fast foods outweigh the negative aspects." This may be because it is tempting to order foods higher in energy and fats, as they did indicate that they liked the taste of fast foods.

A limitation of the study is that all the data, including that of height and weight, were self-reported. The findings of the current study cannot be generalized for all college students' fast-food eating behaviors; however, these findings are in agreement with the limited number of studies published on the topic. Fast-food consumption habits and nutrition self-assessments and beliefs of college students may not be the same in different regions of the country. Fast foods may not be as easily available in some locations as others.

The findings of the current study indicate that college students commonly eat at fast-food restaurants, likely because they have limited time, they enjoy the taste, they like to eat with friends or family, and many think, especially men, that fast-food restaurants are inexpensive and economical. Eating at fast-food restaurants may be part of their lifestyles. Some differences were observed by sex in the present study as to why students ate in fast-food restaurants, where they got their nutrition knowledge, the energy content of the fast-food item influencing their selections, and the nutrition belief that the nutritional content of food is of concern to them. A Healthy Campus 2010 objective deals with nutrition and overweight [39]. Nutrition consultants and educators should recognize that college students are going to frequent fast-food restaurants and develop materials useful in helping these young adults consume healthful diets no matter where they eat.

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