

Research and Professional Briefs

Long-Haul Truck Drivers Want Healthful Meal Options at Truck-Stop Restaurants

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ABSTRACT

Long-haul truckers are confined, by parking regulations and other constraints, to dining at truck-stop restaurants. Objectives were to (a) compare truckers' anthropometrics with recommended guidelines; and (b) assess eating/exercise habits, importance of healthful food choices, and attitudes about restaurants' provision of healthful options. Hypotheses were: (a) overweight/obese drivers will place less importance on healthful food choices than will drivers of optimal weight; (b) importance of healthful food choices and attitudes about their provision will be positively correlated. Questionnaires included *Food Choices Index*, *Nutrition Attitude Survey*, and demographic information; bioelectrical impedance assessed weight, body fat, and body mass index. Subjects (n=92) were truckers at a Midwestern truck-stop restaurant; 79 were overweight, 52 were obese. Mean rating of importance of healthful choices was above average. There was no difference in importance of healthful food choices for overweight/obese and optimal weight drivers, $t(89) = -1.312$; $P = 0.19$. Drivers placing more importance on healthful food choices had more positive attitudes about restaurants' provision of such options, $r(90) = 0.74$, $P < 0.001$. Overall, drivers indicated they would choose healthful foods if available and appetizing. Registered dietitian-directed wellness programs that include education, support, and cooperation of truck-stop restaurants

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are critical to reduce obesity and risk of disease in this population.

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Long-haul truckers play crucial roles in the flow of commerce across America, but the conditions of their work environment and health have remained largely unstudied. Most long-haul truckers eat poorly and lead sedentary lifestyles (1), factors that are linked to cardiovascular disease, type 2 diabetes, and metabolic syndrome (2-5). Drivers have a greater risk of developing medical problems than the general population (2,3).

Federal laws restrict driving hours; to maximize them, drivers may snack all day, consuming one large meal at their shift's end. Some cabs have refrigerators that can hold limited supplies, but perishable foods must be purchased en route. Efforts to do so, however, are thwarted by large-vehicle parking restrictions (6), and drivers essentially must eat at truck-stop restaurants.

For this study, a registered dietitian reviewed menus of three truck-stop franchises, finding many high-calorie/high-fat choices, and few fresh-produce or whole-grain items (7-10). Deaths from cancer, heart disease, and stroke decrease with increased fruit and vegetable intake (11); and risk of stroke decreases by 11% for each additional fruit serving and 3% for each additional vegetable serving per day (12). Limited access to fruits and vegetables exacerbates health risks for this population. With limited eating options, truckers would need to exert much dietary vigilance to maintain good health.

Objectives of this study included comparison of truck drivers' anthropometrics with recommended guidelines for optimal health, and assessment of (a) eating/exercise habits, (b) importance of healthful food choices, and (c) attitudes about provision of healthful foods by truck-stop restaurants. It was hypothesized that overweight/obese drivers would place less importance on healthful food choices than would those with optimal weights. Drivers who placed greater importance on healthful food choices were hypothesized to have more positive attitudes about restaurants' provision of such foods.

METHODS

The Institutional Review Board of Northern Illinois University granted permission to use human subjects in research. The descriptive, cross-sectional pilot study surveyed 92 long-haul truck drivers at a Midwestern franchised truck-stop restaurant. During two afternoons of data collection, all patrons who identified themselves as drivers were offered \$20 to participate. Recruitment

did not discriminate on the basis of race, color, religion, national origin, ancestry, sex, marital status, or sexual orientation. Of 100 drivers contacted, 92 agreed to participate, constituting a 92% response rate. Subjects signed consent forms and completed questionnaires consisting of (a) *Food Choices Index* (13), (b) *Nutrition Attitude Survey* (14), and (c) demographic information (age, sex, number of years driving trucks, exercise habits, and fruit/vegetable consumption). Anthropometrics also were measured.

A *Food Choices Index* (13) measured importance of healthful food choices. Content validity originally was established based on the work of >30 researchers reported in 12 scientific studies. Designed to examine high-school students' perceptions about cafeteria food choices (13), it was adapted for use with truck drivers (eg, references to "school cafeteria" were changed to "truck-stop restaurants," "It's not cool to eat low-fat foods," was changed to "A real man doesn't eat low-fat foods," and two items were reverse-coded). Responses were summed to produce scores.

A *Nutrition Attitude Survey* (14) measured attitudes about truck-stop restaurants' provision of healthful foods. Designed to measure consumers' expectations for nutrition in restaurants, the instrument was adapted for truck drivers. Responses were summed to produce scores. Cronbach's α coefficient for the original instrument was .87 (14).

Miller and colleagues, in their 2002 lifestyle intervention experiment, used the measure of approximately 30 minutes of exercise of sustained duration three times per week to quantify activity level (15). For the current study, self-report of days per week of 30 minutes' sustained duration of exercise provided data about truckers' exercise habits. Joshipura and colleagues (16) used self-reports of 113,000 participants to provide data on fruit and vegetable consumption; for the current study, self-report of average fruit/vegetable consumption/day was used.

Anthropometrics were measured with subjects in light clothing and bare feet in a semi-private area of the eating facility. A registered dietitian trained in measuring anthropometrics measured height once per subject to the nearest 1/2 inch using a wall-mounted 6-Foot Growing Gauge vinyl measurement chart (Delta Education, Nashua, NH). (An additional 12 inches of a second chart was added above the chart to accommodate heights >72 inches.) A flat board placed atop the head and perpendicular to the wall pinpointed height measurement. The registered dietitian measured waist circumference once to the nearest 1/2 inch using a cloth measurement tape anteriorly halfway between the lowest lateral portion of the ribcage and the iliac crest. A waist measurement of >40 inches in males and 35 inches in females is a known risk factor for cardiovascular disease and type 2 diabetes (17). These guidelines served as assessment criteria for this measurement.

A Tanita analyzer (Tanita Body Composition Analyzer TBF-300A, Arlington Heights, IL) assessed weight, body fat percentage, and body mass index (BMI). The analyzer calculated BMI using the standard weight/height equation (kg/m^2) (18). A BMI of 18.5 to 24.9 is suggestive of optimal weight; BMI measurements ≥ 25 indicate overweight, ≥ 30 , obesity, and ≥ 40 indicate extreme obesity

(18). Percentages of body fat for optimal health vary by age. Participants were assessed by age for body fat percentages as acceptable, overweight, or obese (18). These standards served as additional assessment criteria for weight status.

SPSS 13.0 for Windows (2004, SPSS, Inc, Chicago, IL) analyzed data. For the hypothesis that overweight/obese drivers would place less importance on healthful food choices than would those with optimal measurements, subjects were divided into two groups based on BMI, body fat percentage, and/or waist circumference. Those for whom any of the three measurements exceeded acceptable limits (BMI ≥ 25 ; age-based body fat designations for overweight/obesity; waist circumference >40 inches for men, >35 inches for women) constituted one group. All others were placed into the second group. According to the National Heart, Lung, and Blood Institute (17), disease risks for type 2 diabetes, hypertension, and cardiovascular disease range from high to extremely high for those in the overweight/obese group.

For both the *Food Choices Index* (13) and the *Nutrition Attitude Survey* (14), examinations were made of histograms depicting distribution of scores; for each, the Empirical Rule (19) was applied, using mean scores and standard deviations. In both cases, scores were approximately normally distributed about the mean; thus, parametric tests were used for testing hypotheses. A *t* test of independent samples tested the hypothesis that overweight/obese truck drivers would place less importance on healthful food choices than would drivers with optimal weights. Pearson's *r* correlation tested the hypothesis that truck drivers placing greater importance on healthful food choices would have more positive attitudes about restaurants' provision of such choices. Probability levels were set at $\alpha = .05$.

RESULTS AND DISCUSSION

Ninety-two drivers participated in the study. Table 1 summarizes demographic characteristics and anthropometric measurements of participants. Based on BMI measurements for 91 subjects, 79 were overweight; of these, 52 were either obese or extremely obese. Few reported eating more than three servings of fruits and vegetables daily, and 11 ate no fruits and vegetables at all.

The range of possible scores on the *Food Choices Index* (13) was 15 to 75, with higher scores indicating higher perceived importance of nutritious food choices. A mean (\pm standard deviation) score of 56.94 ± 7.66 indicated that healthful choices were important to drivers. Cronbach's α coefficient was .80, an acceptable level of internal consistency. See Table 2 for median responses on individual items.

The range of possible scores for the *Nutrition Attitude Survey* (14) was 12 to 60, with higher scores indicating more-positive attitudes. A mean (\pm standard deviation) score of 44.84 ± 5.68 indicated positive attitudes about restaurants' provision of healthful food choices. Cronbach's α coefficient was .76, an acceptable level of internal consistency (see Table 2).

The hypothesis that overweight/obese truck drivers would place less importance on healthful food choices was not supported, $t(89) = -1.312$; $P = 0.193$. There was no dif-

Table 1. Demographic characteristics and anthropometric measurements of long-haul truck drivers (n=92)

Variables	n	Median	Mean	Standard deviation
Age in years		46.00	44.34	±10.61
30 and younger	11			
31-40	20			
41-50	32			
51 and older	24			
Sex				
Male	87			
Female	5			
Years employed as driver		10.00	13.91	±12.51
≤5	38			
6-15	21			
16-25	13			
≥26	20			
Body mass index^{ab}		31.70	32.63	±8.02
18.5-24.9 (normal)	12			
25-29.9 (overweight)	27			
30-39.9 (obese)	37			
40+ (extremely obese)	15			
Waist circumference in inches		43.00	44.08	±7.68
Males				
<40	23			
≥40	64			
Females				
<35	2			
≥35	3			
Body fat percentage^b				
Female		40.60	41.44	±10.33
Male		29.75	29.88	±9.43
Within acceptable range by age	19			
Within overweight range by age	23			
Within obesity range by age	49			
Servings fruits/vegetables daily		1.50	1.72	±1.12
None	11			
1	37			
2	21			
3	17			
>3	6			
Days/week exercised for 30 minutes sustained duration		2.00	2.19	±2.28
None	33			
1	8			
2	21			
3	8			
4	22			

^aCalculated as kg/m².

^bSee ref. 18.

ference in importance of healthful food choices based on whether drivers were overweight/obese or of optimal weight. Hypothesis 2, that drivers who placed greater importance on healthful food choices would have more positive attitudes about restaurants' provision of healthful food choices, was supported, $r(90)=0.74$, $P<0.001$. That is, drivers who valued healthful food choices indicated they would choose the more nutritious options if restaurants offered them.

Approximately 65% of the American public is overweight, with nearly half of those considered obese (20). Long-haul drivers exceeded these statistics: 79 (86%) were overweight, and 66% of those (n=52) were obese. Drivers reported lack of physical activity and poor nutrition; such lifestyle habits likely contributed to excess weight, increasing the risk for disease.

Findings indicated that healthful choices were important to drivers—it was encouraging that there was no difference in perceived importance based on anthropometric measurements. While one would expect that overweight/obese drivers would be less concerned about healthful eating, that was not the case; healthful options were important regardless of weight status, an indication that, for a population that needs diet improvement, interest is high. Whether drivers can determine which foods represent healthful choices, however, is not known.

Overall, truckers had positive attitudes about restaurants' provision of healthful foods, particularly truckers who placed higher value on healthful choices. But, herein lies a contradiction. Drivers indicated they wanted more healthful options, yet their consumption of available fruits and vegetables, food groups known to decrease disease risks (11,12), was well below the recommended level. This may be due to the paucity of fruit and vegetable offerings in truck-stop restaurants, lack of nutrition knowledge, higher prices for fresh produce items, or perceptions that such foods taste bad.

Taste appears to guide food choices; survey responses indicated that taste was more important than nutrition. A next step, then, would be to demonstrate that nutritious foods can taste good. Like many Americans, truck drivers' palates require mouth-and-mind-engaging foods—if nutritious foods do not taste good, people opt for less-healthful alternatives (13,21). Drivers want to improve health, but not if it means a reduction in palatability.

This was a pilot study, and the small convenience sample was a limitation. The size and nonprobability nature of a sample that included drivers patronizing only one Midwestern truck-stop restaurant may have introduced sample bias. Some declined participation due to time constraints, fatigue, or lack of interest; thus, findings cannot be generalized to all long-haul drivers. Collection of single anthropometric measurements was a limitation as well and, although most subjects were male, revision of the *Food Choices Index* (13) may have added sex bias.

Menus that contributed information about truck-stop restaurant offerings were from three large franchises; independent companies operating foodservices at truck stops may offer different options. Nevertheless, drivers' health depends in large part on choices available—if drivers are unhappy with selections, they have little recourse. Restaurant operators serve a captive audience, offering

Table 2. Median responses of long-haul truck drivers for items making up the measurement instruments

	Median response ^b
Individual items for <i>Food Choices Index</i>^a	
1. I think about my health when deciding what to eat.	4.00
2. I think about my weight when deciding what to eat.	4.00
3. Taste is important to me when I am choosing foods from truck-stop restaurant menus.	5.00
4. Fat content is NOT important to me when I am choosing foods from truck-stop restaurant menus.	3.00 ^c
5. Getting a lot for my money is important to me when I am choosing foods from truck-stop restaurant menus.	4.00
6. If information on the fat content of foods was displayed on the menu, I would use this information to make food choices.	4.00
7. It is hard for me to tell which foods on the truck-stop restaurant menu are low-fat and which are high-fat.	4.00
8. I think the high-fat foods sold in the truck-stop restaurant cost more than the low-fat foods.	3.00
9. I would choose low-fat foods over high-fat foods in the truck-stop restaurant if the low-fat foods cost less than the high-fat foods.	4.00
10. Eating healthful foods is important to me.	4.00
11. I would like the low-fat foods in the truck-stop restaurant to be labeled as low-fat.	4.00
12. The truck-stop restaurant should offer more healthful low-fat foods.	4.00
13. I would buy more low-fat foods from the truck-stop restaurant if there was a larger selection of low-fat foods.	4.00
14. I think low-fat foods taste good.	3.00
15. A real man doesn't eat low-fat foods.	4.00 ^d
Individual items for <i>Nutrition Attitude Survey</i>^a	
1. Truck-stop restaurants should promote healthful menu items to their consumers.	4.00
2. In recipe development, richer flavors should be achieved without adding fat or salt.	4.00
3. Truck-stop restaurants should provide low-calorie, low fat, and low-cholesterol options on the menu.	4.00
4. Truck-stop restaurants should increase the number of low-calorie menu items offered.	4.00
5. Nutrition concerns are critical to menu development.	4.00
6. Truck-stop restaurants should strive to use more nutritious ingredients, even at extra cost.	4.00
7. Truck-stop restaurants should promote a healthful lifestyle for their consumers.	4.00
8. Truck-stop restaurants should provide nutrition education to their consumers.	3.00
9. Truck-stop restaurants should improve the health of their customers.	3.00
10. Customers are more concerned with how foods taste than with their nutritional content.	2.00 ^c
11. When eating away from home, customers are not really interested in nutrition.	2.00 ^e
12. Nutrition is an important factor in determining where people eat meals away from home.	3.00
^a n=92.	
^b Response choices ranged from 1=strongly disagree to 5=strongly agree. Higher numbers reflect more importance (<i>Food Choices Index</i>) or more positive attitudes (<i>Nutrition Attitude Survey</i>).	
^c Reverse-coded; original median response=3.00.	
^d Reverse-coded; original median response=2.00.	
^e Reverse-coded; original median response=4.00.	

what sells, regardless of the ramifications to drivers' health.

CONCLUSIONS

While obesity continues to increase among Americans (22), for long-haul drivers the problem is much more severe. Nearly two thirds of drivers in this study were obese, greatly increasing their risk for hypertension, type 2 diabetes, and cardiovascular problems (17). Nationwide trucker wellness programs are critical to increase awareness of health risks and motivate drivers to solicit more nutritious choices at truck stops. Importantly, neither restaurant owners nor truckers have accurate perceptions about which food choices are healthful. It is imperative then that wellness programs and efforts to improve menu options be guided by registered dietitians.

Drivers who placed greater importance on healthful food choices had more positive attitudes about restaurants' provision of such options. Responses to individual survey items, however, indicated that drivers were very concerned with taste. Registered dietitian-directed programs can demonstrate that properly prepared nutritious foods can taste good, with the added benefit of contributing to better health.

This pilot study of long-haul drivers represents a first step in documenting anthropometric measurements indicating increased risk for disease, and providing evidence that drivers want nutritious food options. Truckers recognize the importance of healthful food choices, but are constrained in their pursuit of them by their dependence upon truck-stop restaurant fare. Larger studies using probability samples to decrease the introduction of bias, and that represent the trucker population nationwide,

are needed; if results are similar to the findings of this study, they can guide efforts to improve the well-being of long-haul drivers.

References

1. Roberts S. Design, development and evaluation of driver wellness programs. *Technical Memorandum Number Three: Pilot Test Results and Marketing Plan*. Washington, DC: Federal Motor Carrier Safety Administration, Office of Research and Technology; 1999.
2. Robinson CF, Burnett CA. Truck drivers and heart disease in the United States, 1979-1990. *Am J Ind Med*. 2005;47:113-119.
3. Bigert C, Gustavsson P, Hallquist J, Hogstedt C, Lewné M, Plato N, Reuterwall C, Scheele P. Myocardial infarction among professional drivers. *Epidemiology*. 2003;14:333-339.
4. Duncan GE. Exercise, fitness, and cardiovascular disease risk in type 2 diabetes and the metabolic syndrome. *Curr Diab Rep*. 2006;6:29-35.
5. Gill JM, Malkova D. Physical activity, fitness and cardiovascular disease risk in adults: Interactions with insulin resistance and obesity. *Clin Sci (Lond)*. 2006;110:409-425.
6. Abilene TX city wide ordinance on no truck parking. Available at: <http://www.petitionspot.com/petitions/notruckparking/signatures>. Accessed March 27, 2006.
7. Country Market Restaurant and Buffet menu. Flying J, Inc: Ogden, UT; 2003.
8. Iron Skillet menu. Petro Stopping Centers, LP: El Paso, TX; 2004.
9. TravelCenters of America menu. TravelCenters of America: Westlake, OH; 2006.
10. Pennington JA, Douglass JS. *Bowes and Church's Food Values of Portions Commonly Used*. 18th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004.
11. Tobias M, Turley M, Stefanogiannis N, Vander Hoorn S, Lawes C, Mhutchu CN, Rodgers A. Vegetable and fruit intake and mortality from chronic disease in New Zealand. *Aust N Z J Public Health*. 2006;30:26-31.
12. Dauchet L, Amouyel P, Dallongeville J. Fruit and vegetable consumption and risk of stroke: A meta-analysis of cohort studies. *Neurology*. 2005;65:1193-1197.
13. Shannon C, Story M, Fulkerson J, French S. Factors in the school cafeteria influencing food choices by high school students. *J Sch Health* 2002;72:229-234.
14. Sneed J, Burkhalter JP. Marketing nutrition in restaurants: A survey of current practices and attitudes. *J Am Diet Assoc*. 1991;91:459-462.
15. Miller ER 3rd, Erlinger TP, Young DR, Jehn M, Charleston J, Rhodes D, Wasan SK, Appel LJ. Results of the diet, exercise, and weight loss intervention trial (DEW-IT). *Hypertension*. 2002;40:612-618.
16. Joshipura KJ, Ascherio A, Manson JE, Stampfer MJ, Rimm EB, Speizer FE, Hennekens CH, Spiegelman D, Willett WC. Fruit and vegetable intake in relation to risk of ischemic stroke. *JAMA*. 1999; 282:1233-1239.
17. National Heart, Lung, and Blood Institute. Classification of overweight and obesity by BMI, waist circumference, and associated disease risks. Available at: http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/bmi_dis.htm. Accessed November 29, 2006.
18. Gallagher D, Heymsfield S, Heo M, Jebb S, Murgatroyd P, Sakamoto Y. Healthy percentage body fat ranges: An approach for developing guidelines based on body mass index. *Am J Clin Nutr*. 2000;72:694-701.
19. NetMBA. The normal distribution (bell curve). Internet Center for Management and Business Administration, Inc. Available at: <http://www.netmba.com/statistics/distribution/normal/>. Accessed December 2, 2006.
20. Hedley A, Ogden C, Johnson C, Carroll M, Curtin L, Flegal K. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA*. 2004;291:2847-2850.
21. Albright C, Flora J, Fortmann S. Restaurant menu labeling: Impact of nutrition information on entrée sales and patron attitudes. *Health Educ Q*. 1990;17:157-167.
22. Flegal M, Carroll M, Ogden C, Johnson C. Prevalence and trends in obesity among US adults, 1999-2000. *JAMA*. 2002;288:1723-1727.