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Frequency of eating out at both fast-food and sit-down restaurants was associated with high body mass index in non-large metropolitan communities in Midwest

Surabhi Bhutani, PhD.[1], **Dale A Schoeller, PhD.**[1], **Matthew C Walsh, PhD.**[2], and **Christine McWilliams, MS.**[2]

[1]Department of Nutritional Sciences, University of Wisconsin, Madison, Wisconsin, 53706,USA

[2]Department of Population Health Sciences, University of Wisconsin, School of Medicine and Public Health, Madison, Wisconsin, 53726, USA

Abstract

Purpose—We investigated associations between frequency of eating at fast-food, fast-casual, all-you-can-eat, and sit-down restaurants and body mass index (BMI) in non-large metro Wisconsin communities. To inform prevention efforts, we also analyzed socioeconomic/environmental and nutrition attitudes/behavior variables that may drive frequent eating-away-from-home.

Design—Cross-sectional analysis of an ancillary dataset from the Survey of Health of Wisconsin collected between Oct. 2012 and Feb. 2013.

Setting—Six Wisconsin counties; one classified as rural, one as large fringe metro and four as small metro.

Subjects—Adults ≥ 18 years (n = 1418).

Measures—Field staff measured height, weight and administered a survey on frequency of eating-away-from-home, socioeconomic and nutritional behavior variables.

Analysis—Multivariable regression.

Results—BMI of respondents averaged 29.4 kg/m^2, (39% obese). Every one-meal/week increase in fast-food and sit-down restaurant consumption was associated with increase in BMI by 0.8 and 0.6 kg/m^2 respectively. Unavailability of healthy foods at shopping and eating venues, and lack of cooking skills were both positively associated with consumption of fast-food and sit-down meals. Individuals who described their diet as healthy, who avoided high fat foods and who believed their diet was keeping their weight controlled did not visit these restaurants frequently.

Conclusion—Obesity prevention efforts in non-large metro Wisconsin communities should consider socioeconomic/environmental and nutritional attitudes/behavior of residents when designing restaurant based or community education interventions.

Correspondence and reprint requests: Surabhi Bhutani, PhD, Department of Nutritional Sciences, University of Wisconsin Madison, 1415 Linden Drive, Room 407, Madison, Wisconsin 53706, Tel: 608-261-1902, Fax: 608-262-5860, bhutani@nutrisci.wisc.edu.

Keywords

Eating away from home; obesity; nutrition attitude; socioeconomic status; fast-food restaurant; sit-down restaurant

Indexing Key Words

Manuscript format: research; Research purpose: modeling/relationship testing; Study design: non-experimental; Outcome measure: behavioral; Setting: local community; state; Health focus: nutrition; Strategy: built environment; Target population: adults; Target population circumstances: education/income level; race/ethnicity; geographic location

PURPOSE

The Survey of Health of Wisconsin (SHOW) estimates that 37.8% of Wisconsin's adult population is obese[1] as calculated from the height and weight of participants measured by the field staff (data collected 2008–2010). These obesity rates are even higher than the national obesity prevalence (35.7%) calculated from self-reported height and weight data by Centers for Disease Control and Prevention (CDC) (data collected 2009–2010); and thus highlight the importance of understanding underlying factors contributing to excess weight gain in Wisconsin.

Research shows that one of the factors that can lead to excess weight is frequent consumption of foods that are high in calories, fat, and processed carbohydrates and are purchased at retail food outlets.[2–6] Most of the data for this research, however, has been obtained in areas along the East and West coasts[7–9]. Hence, it is not yet known whether the link between frequent eating-away-from-home and high obesity rates also holds true in Midwestern Wisconsin communities. Furthermore, studies in coastal areas focused mainly on urban regions and limited data are available on associations of body mass index (BMI) with proximity to restaurants[10] and frequency of meal consumption[11] in non-large metro areas. Considering the obesity prevalence in non-large metro areas (29% obese) of Wisconsin is similar to the large metro cities (30% obese), an evaluation of frequent restaurant eating on excess weight gain in State's non-large metro areas is warranted.

Frequency of visits to fast-food restaurants and its association with obesity has been extensively studied,[12–14] but only a few US based studies have investigated this relation in other retail food outlets such as, takeout outlets,[15] cuisine specific restaurants (pizza, burger, fried chicken etc.),[16] and total out of home eating. [17–19] Moreover, information is lacking on how other restaurant types, such as fast casual, all-you-can-eat or sit-down restaurants may be contributing to excess body weight, especially in non-large metropolitan settings in a Midwestern state such as Wisconsin in which two-thirds of the population lives in rural and urban communities with population of less than 250,000.[20] While we speculate that the fast-food chain restaurants in urban regions may be similar to fast-food restaurants in non-large metro areas, other restaurant types may differ and also have different associations between frequency of restaurant eating and BMI. It is our expectation that frequent eating-away-from-home at all restaurant types will be positively associated with a greater BMI in the

non-urban and small-urban population. We also expect a dose response relationship between frequency of eating out at the various restaurant types and BMI in these Wisconsin regions.

To inform interventions aimed at improving health, investigators have studied the influence of socioeconomic/environmental variables like income, lack of time, lack of resources, proximity to the restaurant, etc. for restaurant types where recurrent visits are associated with high BMI. [21–23] These evaluations have resulted in targeted interventions that have influenced the restaurant environment by changing foods on the menu, promoting healthy menu items, and/or implementing calorie labeling for menu items in chain restaurants, which is also mandated by the recent US Food and Drug Administration statute.[24] In several large cities, communities and restaurant businesses have already demonstrated positive outcomes by implementing consumer-focused strategies that improve quality of foods offered at the retail food outlets and enable patrons to make healthier choices.[25, 26] For instance, one outlet in California reported an increase in the purchase of lower calorie menu items, after 2-years of creating healthy menu items and posting calorie information on the menu. [27] Similarly, 9 food outlets in San Diego, California created and promoted healthy menu items using table tents, posters, community events, ads in magazines, newspaper, and television. This intervention resulted in a 3.7% greater likelihood to purchase the healthy menu items than the control group after 1 year.[28] To identify strategies and initiate effective interventions that will work for the rural and small metro areas of Wisconsin that are studied here, additional information on the socioeconomic/environmental factors of the residents need to be collected.[29]

Nutritional attitude and behavior related data of individuals are rarely included in predictive models of eating out frequency. Based on previous findings on the positive role of diet and health related knowledge on the overall diet quality,[30, 31] it is our assumption that nutrition-oriented consumers will avoid frequent restaurant visits due to advertised negative health consequences of retail foods. If our assumption is valid, especially for the non-urban and small urban Wisconsin areas, implementing community programs designed to impart nutrition knowledge may have a large impact on the frequent consumption of unhealthy restaurant meals and consequently, obesity. Hence, understanding how nutrition knowledge and attitudes in residents in the study area impact restaurant visits is critical to designing and implementing effective interventions.

The primary aims of this analysis were: 1) to explore the association between frequency of eating-away-from-home and BMI in non-large metropolitan areas of Wisconsin; and 2) to identify the socioeconomic/environmental and nutrition attitude/behavior variables that may have influenced frequent restaurant visits. Evaluating this information will give us a novel insight into the eating-away-from-home behavior in non-urban Wisconsin communities. We worked with six, mostly small metro Wisconsin communities to collect population level data in order to inform evidence-based strategies that will improve healthy eating habits in these communities and aid efforts to reduce obesity.

METHODS

Design

This cross-sectional survey was part of the Centers for Disease Control and Prevention's (CDC) Community Transformation Grant (CTG) effort to develop local interventions and inform policy to address issues related to an unhealthy lifestyle. Transform Wisconsin made an open call to counties in Wisconsin to apply for the CTG grant. Selection of counties was based on organization's capacity and readiness for change. We conducted a secondary data analysis of the information collected from six Wisconsin counties: Kenosha, Rock, Marathon, Winnebago, LaCrosse and Manitowoc between Oct. 2012 and Feb. 2013. Based on the CDC's classification, one of these counties can be categorized as rural, one as large fringe metro and remaining four as small metro.[32] Our data may not fully represent the State because 66.6% of the counties in our dataset classify as small metro, 16% as non-metro (rural) and 16% as large fringe metro, while of the 72 counties in Wisconsin, 64% are non-metro (rural counties), 15% small metro, 0.1% large fringe metro (suburban). These counties all received transformation grants to implement healthy eating, active living, and smoke-free environment interventions after our survey data were collected.

Sample

The CTG survey had two aims, assessment of smoking with an emphasis on multi-unit housing and assessment of active living and healthy eating. For sample selection, we stratified residences by county and multi-housing units and performed simple random sampling within strata. Because individuals in multi-unit homes are a small fraction of each community, we slightly oversampled multi-unit housing structures (varying 1.2–7.4% by county) for adequate power.

Mailing addresses of all households were purchased from Marketing Systems Group – GENESYS (Horsham, PA) and a random sample of addresses were chosen. An advance letter describing the study was mailed to households 2-weeks prior to the in-person visit. Field interviewers visited selected households up to six times before eliminating that address from the role. If the residents were found at home, participation was discussed and a household screener was completed. All civilian non-institutionalized adults ≥18 years from each selected household were invited to participate in the study. After providing consent, each participant completed a 45–60 minute interviewer-administered survey, which was de-identified before data entry. Local field staff was trained to collect data in randomly selected homes in these six counties. Staff also measured height, weight, waist and hip circumference, blood pressure and BMI was calculated. Participants were given an incentive of up to $50 for participation. This study was determined to be exempt from IRB by the University of Madison Health Sciences IRB.

Measures

Frequency of eating out—To aid local obesity prevention efforts, respondents were asked to report the frequency of eating at different restaurant types including fast-food restaurants, fast casual restaurants, all you can eat restaurants and sit-down restaurants. Fast-food restaurants were defined as those similar to chains like McDonalds, Pizza Hut, Burger

King etc.; fast casual restaurants were defined as somewhat quieter and slower paced than fast-food restaurants e.g. Noodles and Company, Panera Bread, or cafeterias; All-you-can-eat restaurants were places where unlimited meals are served at one price e.g. Old Country Buffet, Ponderosa etc.; and a sit-down restaurants are places where people sit and a staff person takes an order. The response scale for eating out at each restaurant type was (1) Never, (2) Rarely, (3) Sometimes (1–3/month), (4) 1–2 times/week (5) 3–4 times/week and (6)>5 times/week. Based on the distribution of responses, these categories were collapsed to (1) Never/Rarely, (2) Sometimes (1–3 times/month), (3) 1–2 times/week, (4) >=3 times/week. These questions were adopted from NHANES 2005–2006, modified, and incorporated in the Survey of Health of Wisconsin questionnaire. Same questions have been used yearly since 2008 to collect eating out information from Wisconsin residents.

Socioeconomic/environmental and nutrition attitude/behavior variables—An important objective of this evaluation was to enumerate whether certain factors influence eating out at a certain restaurant type. For this analysis, participants were asked a set of validated questions on factors that may have influenced their dietary behaviors (Table 4).[33] Responses were coded as “1) Applies to me” or “2) Does not apply to me”. These questions covered socioeconomic/environmental variables, including lack of time, storage space, equipment, affordability and lack of healthy food choices. Additionally, questions including self-perception of body weight, self-perception of diet, family encouragement to eat healthy, lack of knowledge and lack of motivation were categorized as nutrition attitude/behavior variables.

Since one of the aims of this data collection was to assess smoking in multi-unit housing, self reported data on smoking was collected. Participants were asked whether it is allowed to smoke inside their house. Reponses were coded as: 1) Not allowed, 2) Allowed sometimes, 3) Allowed anywhere in the house, 4) No rules about smoking inside the house. Based on the distribution of responses, these categories were collapsed to: 1) Smoke inside the house, 2) No smoking inside the house.

Statistical analysis

To account for the oversampling of households in the sampling design of the evaluation, all analyses used sampling weights. For analysis of the first aim, multiple linear regression models were created using BMI as a dependent variable for each of the four restaurant categories. All models were adjusted for common confounders for BMI including age, sex, education, income, smoking, and marital status. Smoking was included in the model due to its previously established associations with obesity.

Because both the fast-food and sit-down restaurants were associated with BMI in our population group, for our second aim we combined the frequencies of visits to these restaurant types. A multivariate linear regression model was created with combined frequencies of restaurant visits as dependent variable and socioeconomic/environmental and nutrition attitude/behavior related variables as independent predictors. A total of 20 socioeconomic/environmental and nutrition attitude/behavior variables were investigated and the backward elimination procedure was used to remove the non-significant variables. The

model was adjusted for age, sex, education level, marital status, income and family members per household. Frequencies of eating at fast casual and all-you-can-eat restaurant were also accounted for in these models. A P value of < 0.05 was chosen for statistical significance. Analyses were performed using SAS statistical package, version 9.4 (SAS Institute, Cary, NC).

RESULTS

Selected baseline characteristics of the study participants are presented in Table 1. Briefly, data was collected from 1418 individuals in six non-large metropolitan counties of Wisconsin with an average age of 48 years (25/75 percentile: 32–63 y). Thirty-nine percent of the participants were obese, with an average BMI of 29 kg/m^2.

Frequency of eating out at different restaurant types is presented in Table 2. On average participants reported eating out 1.86 times per week. Overall, 21% of individuals reported going out to eat more than three times a week. Eating out at a fast-food restaurant was most frequently reported, followed by a sit-down restaurant. When we estimated the association between BMI and the frequency of eating out for each of the four types of restaurants in a single model, our analysis showed a significant positive association between frequent eating out at both fast-food and sit-down restaurants with BMI (0.8 and 0.6 kg/m^2 respectively) (Table 3). A post-hoc analysis of BMI in each restaurant category with the frequency of eating out response indicated a dose-response effect in fast-food restaurants. No such dose response effects were observed in sit-down restaurant category (data not shown). Fast-casual and all-you- can-eat restaurants did not reach statistical significance presumably due to their lower reported frequencies. Since both fast-food and sit-down restaurant visits were associated with greater BMI, we combined the frequencies of eating at these restaurant types for further analysis.

Table 4 presents the model showing association of combined frequency of eating out at these two restaurants with socioeconomic/environmental and nutrition attitude/behavior variables. In our population group, individuals who described their diet as healthy and believed that their diet was keeping their weight controlled ate less frequently at fast-food and sit-down restaurants. Of particular note, 20% of the participants who considered their diet as healthy avoided both fast-food and sit-down restaurants (data not tabulated). Of the total participants who considered their diet as healthy, 40% were overweight or obese; and 56% of participants who reported that their diet is keeping their weight healthy were overweight or obese. Individuals avoiding high fat food also never/rarely frequented the two restaurant types. Participants who reported lack of availability of healthy choices at shopping and eating venues and lack of cooking skills were more likely to frequent the two restaurant types. Frequency of eating out at restaurants was associated with BMI; however, research shows that already overweight/obese individuals also tend to eat away from home frequently. [34] To test whether it was true for our population group, we added BMI as an independent variable to the same model. No effect of BMI was observed, except lack of cooking skills was no longer associated with frequency of eating out (data not shown).

DISCUSSION

This secondary data analysis adds to the growing literature on complex associations between socioeconomic variables and frequency of away from home food consumption. Participants who reported eating frequently at either fast-food and sit-down restaurants were more likely to have higher BMIs. We also found that individuals concerned with their diet and weight reported visiting these establishments less frequently compared to those lacked cooking skills and healthier food choices. This study differs from the previous work [8, 21, 22] by including nutrition attitude/behavior, indicative of barriers to healthy eating, in addition to the socioeconomic/environmental variables, as predictors of frequent restaurant eating and consequent obesity. This analysis is also novel because there is very limited data on frequency of restaurant eating and these influencing factors in non-large metropolitan Midwestern communities. We hope to use these results to aid non-urban Wisconsin communities develop targeted obesity prevention efforts such as, making healthy options available in restaurants and interventions on promoting healthy menu items.

We evaluated the frequency of eating-away-from-home in our dataset because of its previously established positive associations with BMI. [35–37] Consistent with findings from those scientific analyses, we also found a positive association of frequent fast-food consumption with greater BMI. Moreover, our estimated increment in BMI of 0.8 kg/m^2 with every one-meal/week increase in fast-food consumption agrees with the 0.13 kg/m^2 reported in the CARDIA study. [13] This association may reflect the high content of energy, [38–40] total fat and saturated fat, processed carbohydrates, [39] sugar and lower content of fruits, vegetables and micronutrient density [12, 39, 41] in fast-food. In our analysis, we also found frequent sit-down restaurant visits to be positively associated with the BMI, which was in contrast to the findings of other researchers. [42, 43] A decrease in body weight with frequent sit-down restaurant visits reported by Mehta et al. and Bezerra et al.[42, 43] may be explained by the availability of healthier menu options in the restaurants their study population frequented.[43] Unlike these other reports, positive associations between frequent sit-down restaurant visits and BMI in our dataset indicate that sit-down restaurants in our communities include many bar-and-grill establishments and their menu options may not be conducive to healthy eating (personal communication, A. Martinez-Donate). It is important to note, however, that information on the menus of this restaurant type is not available and these are speculations. Another possible explanation for our positive association is that menu items vary broadly in calorie per serving, serving sizes and calorie density among sit-down restaurants, [44] and positive association with BMI in our population probably indicates personal preference for obesogenic menu items such as, high sugar, high fat energy dense foods. Further analyses are warranted to identify sit-down restaurants in which healthy choices are missing or limited so that stakeholders can create programs for healthier Wisconsin communities. Although our analysis was underpowered with respect to food outlets such as buffet restaurants and cafeterias, other investigators have indicated their strong role in overeating and obesity.[11, 45] For example, Casey et al. in a cross-sectional survey data set identified that 33% of the participants visiting buffet restaurants frequently were obese.[11] Data on menu items and the kinds of foods consumed by Wisconsin residents at these different restaurant types is warranted.

Since both fast-food and sit-down restaurant visits were positively associated with BMI, we combined their frequencies in order to identify the socioeconomic/environmental and nutrition attitude/behaviors that may influence frequent eating-away-from-home. Our analysis found that less cooking at home due to perceived lack of cooking skills is associated with frequent fast-food and sit-down meal consumption. Dave et al. reported a similar outcome in their cross-sectional analyses, where dislike for cooking was associated with higher frequency of fast food intake. [46] Larson et al. also supported these results by showing that frequent food preparations at home lead to less frequent fast food intake in young adults. [47] A novel finding of our analysis is that individuals who considered their diet to be healthy and believed that their diet is helping them maintain a healthy body weight avoided frequent restaurant visits. These results indicate that individuals who are aware of the benefits of a healthy diet also understand the poor diet quality of restaurant food and therefore avoid eating out frequently. Our findings suggest the need to develop effective programs to improve nutrition knowledge in Wisconsin communities.

There are some limitations to our evaluation. As noted earlier, our data may not represent the state due to the inclusion of large number of non-large metro areas in the analyses. Additionally, this cross-sectional study design does not provide us with an opportunity to find a causal relationship between socioeconomic/environmental and nutrition attitude/behavior variables and frequency of eating out at different restaurant settings. These data were collected to identify problem areas that communities could address. Moreover, the information collected on the frequency of eating out at different restaurant types is self-reported and may be inaccurate due to memory lapses on the part of the respondents and/or social desirability bias. We also lack information on medical advice that may have influenced the choice of restaurant or reduced the frequency of consumption and physical activity levels of the participants. Information about any systematic differences between those who participated in the study and those who declined to participate is also missing. Furthermore, Wisconsin population is predominantly Caucasian and therefore we did not include ethnicity as a confounder. In addition, our data collected for this evaluation did not include other eating out venues or take out businesses such as cafeterias, supermarkets, street vendors etc., nor information on the density of food outlets, which may also contribute to obesity. Our data set also lacked objective information on local healthier choices available outside the home. Further analysis of restaurant options around these communities will give us a clearer picture.

Overall, the knowledge gained can be useful in many ways for developing effective interventions and policies to create healthier communities. In a literature review of community-based interventions to promote health eating in restaurants, authors concluded that point of purchase information with promotion, and increased availability of healthy choices were most effective in improving dietary intake outside the home in urban communities.[29] Recently, the same research group implemented a pilot intervention “Waupaca Eating Smart” focused on labeling, promoting and increasing availability of healthy foods in seven restaurants in two Midwestern rural communities.[48] Restaurant food environment scores improved significantly in the intervention group suggesting that this intervention may be successfully implemented in our communities. In a similar study called Baltimore healthy carryout trial,[49] researchers improved labeling on the menu boards,

promoted healthy sides and beverages and introduced healthy combo meals in 8 carry-out locations in low income Baltimore communities. Results indicated an improvement in types of foods purchased and the intervention was immediately adopted as a citywide intervention. Since the communities we studied have similar structure, these restaurant-focused initiatives may be successfully implemented and may influence individuals to choose healthier items at restaurants. It is important to understand that people will be exposed to fast-food and sit-down restaurants every day; however, educating individuals to improve cooking skills or to rely on others they trust to cook for them may avoid dependence on these restaurant meals. Communities may also increase motivational and education programs focusing on the importance of a healthy diet and teaching tools to prepare healthy meals.

In summary, the present study confirms previous research findings that frequent fast-food consumption is associated with higher BMI. In contrast, however, it weakens the cumulative data relationship between patronizing sit-down restaurants and obesity, by showing a positive association between frequent sit-down restaurant visits and BMI. These findings may be critical to strategically plan targeted interventions for non-large metropolitan and rural Wisconsin communities. Our findings also indicate that understanding the socioeconomic/environmental factors and nutritional attitude/behaviors variables that we speculate drive Wisconsin residents to eat at a restaurant frequently is critical to the success of community based obesity prevention strategies.

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SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Frequent restaurant visits are associated with BMI and obesity in large metropolitan communities; however the information on frequent eating at different restaurant types in non-large metropolitan and small metropolitan communities is lacking. Additionally, the influence of socioeconomic variables on frequent restaurant food consumption is well documented. However, the predictive models rarely included nutrition attitude factors that may influence frequent restaurant eating in non-urban settings.

What does this article add?

Frequent eating out at both fast-food and sit-down restaurants was associated with BMI in non-large metropolitan Wisconsin communities, with stronger association found for fast-food visits. Nutrition conscious individuals are less likely to visit restaurants frequently, while consumers lacking cooking skills and lacking food choices are more likely to visit restaurants frequently.

What are the implications for health promotion practice or research?

Our findings support that understanding variables that may influence frequent eating at obesogenic restaurants is critical to developing community-based healthy restaurant eating interventions. Considering that the majority of these interventions are concentrated towards large metropolitan populations and less attention has been given to less populated regions of the Midwest, these outcomes are especially important for development of effective healthy restaurant eating interventions.

TABLE 1

Demographic and other characteristics of respondents in six Wisconsin counties (n=1418)

Variables	
Age (yr) mean (SE)	48.2 (0.5)
Male (%)	45
Female (%)	55
Body weight (kg) mean (SE)	84.0 (0.6)
Height (inch) mean (SE)	66.6 (0.1)
BMI (kg/m2) mean (SE)	29.4 (0.2)
BMI Status, %	
Underweight	1.2
Healthy weight	27.9
Overweight	32.2
Obese	38.8
Ethnicity %	
White, Non-Hispanic	92
Other	3.2
African American, Non-Hispanic	2.5
Hispanic	2.3
Education, n %	
<High school	7.2
High school	25.5
College/Associate degree	41.6
≥ 4 yrs of College	25.5
Income %	
Less than $20K	27.5
$20K–$50K	34.2
$50K–$100K	27.1
More than $100K	11.1

BMI: Body Mass Index; Underweight: <18.5 kg/m^2 ; Healthy weight: 18.5–24.5 kg/m^2 ; Overweight: 25–29.9 kg/m^2; Obese: ≥30 kg/m^2; M: Male; F: Female; SE: standard error

TABLE 2

Percentage distribution of frequencies of eating out at different restaurant types in six non-urban/small urban Wisconsin counties (n=1418)

Restaurant type	Never/Rarely (<1 time/month)	Sometimes (1–3 times/month)	1–2/week	>3/week
Fast food (%)	33.68	38.75	19.39	8.18
Fast casual (%)	55.23	33.44	9.56	1.65
All you can eat (%)	84.68	13.04	1.69	0.46
Sit down meal (%)	38.38	44.84	14.31	2.41

TABLE 3

The influence of frequency of eating out at different restaurant types on predicting BMI in six non-urban/small urban Wisconsin counties (n=1312)

Predicting BMI	Fast-food		Fast casual		All-you-can-eat		Sit-down	
	Estimate	P	Estimate	P	Estimate	P	Estimate	P
Intercept	26.41		26.67		26.62		26.15	
Freq of eating out (week^{-1})	0.75	**0.001**	−0.20	0.46	0.12	0.79	0.55	**0.04**
Sex								
Male	−0.06	0.88	0.10	0.80	0.06	0.87	0.03	0.93
Education level								
<High school	1.44	0.36	1.65	0.25	1.59	0.28	1.59	0.28
High school	0.15		0.39		0.39		0.31	
2yr college/associate	0.49		0.71		0.70		0.65	
>4yr college								
Age group								
18–34	−1.13	**0.001**	−0.62	**0.001**	−0.72	**0.001**	−0.62	**0.001**
35–54	1.36		1.66		1.62		1.72	
55–74	1.64		1.76		1.72		1.71	
>75								
Marital status								
Married/Living partner	0.62	0.20	0.58	0.23	0.59	0.23	0.70	0.15
Smoking status								
Yes	−0.78	0.132	−0.78	0.14	−0.77	0.14	−0.69	0.19
Income								
<20k	1.10	0.09	1.03	0.13	1.05	0.12	1.30	0.09
20–50K	1.60		1.49		1.52		1.62	
50–100K	0.61		0.54		0.56		0.62	

BMI: Body mass index; sex, education level, age, marital status, smoking and income were included in the model as confounders

TABLE 4

The influence of socioeconomic/environmental and nutrition behavior/attitude variables on predicting combined frequency of visits to fast-food and sit-down restaurant in six non-urban Wisconsin counties (n=1411)

Variables included in the model	Agree with the statement		Model [a]	
	n	%	Estimate	P
Intercept			1.73	
Socioeconomic variables				
I don't have time because of my work	293	21		NS
I don't have time because I have a busy lifestyle	343	24		NS
I don't have the cooking skills	222	15.8	0.37	**0.008**
It takes too long to prepare healthy foods	254	18		NS
I don't have space to keep healthy foods	56	4		NS
I don't have the equipment to prepare healthy foods	64	5		NS
I can't afford healthy food	269	19		NS
There are not a lot of choices when I eat out	289	20	0.20	**0.039**
Healthy options are not available where I shop and eat	72	5		NS
Nutrition attitude/behavior variables				
Within 10 min walking distance from home	577	54		NS
Encouragement from family members to eat healthy	650	95		NS
Avoid high fat foods	371	26.3	−0.27	**0.003**
I believe my diet keeps my weight healthy	891	65	−0.59	**0.001**
Compared to others I describe my diet as healthy	1172	83	−0.28	**0.002**
I don't have will power to change diet	403	29	0.17	0.065
I don't want to change my eating habits	420	30		NS
A healthy diet would be too big a change from my current diet	174	12.5		NS
Healthy food is unappealing	169	12		NS
I don't want to give up the foods I like	793	56		NS
Healthy foods are more perishable	277	20		NS

[a]Model adjusted for age, sex, education, marriage status, income, number of family members, frequency of eating at fast casual restaurants, and frequency of eating at all you can eat restaurants

NS Not significant