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The Relationship Between Fast Food Consumption and BMI among University Female Students

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Abstract: Fast food has become an important part of our diet and the increase in fast-food consumption is likely to continue. Our aim was to study the relationship between fast food and Body Mass Index (BMI) and the pattern of consumption of fast food in female university students. Total of 141 female students from different study levels of Nutrition and Food Science Department, King Saud University (KSU), Riyadh Saudi Arabia were included. A survey questionnaire which contains three sections was used; firstly sociodemographic data, secondly fast food consumptions pattern and thirdly whether students apply basic nutrition knowledge in their selection of food or not. Height, weight and BMI were measured. We found that overweight and obesity were present in 25% of female students. Fast food consumption frequency of 1-2 times per week was high among them (74.5%). There is no significant relationship between fast food consumption, BMI and the pattern of consumption of fast food. There is a significant ($p \leq 0.05$) positive relationship between increase in size of fish sandwich meal and increase of BMI. However there is no significant relationship between portion size of other food types and BMI. Moreover, we found significant ($p \leq 0.05$) positive relationship between university study level and the knowledge in explaining why fast food is unhealthy.

Key words: Fast food, BMI, unhealthy food, obesity

INTRODUCTION

One of the most important recent changes leading to an obesogenic environment is the increased of fast food consumption. College's students are highly exposed to unhealthy eating habits leading to body weight gain (Huang *et al*., 2003). Because of time constrains, convenience and life style, fast food has become increasingly an important part of the American diet (Paeratakul *et al*., 2003) and the growth of fast food industry has been an important environment inducement for increases food consumption (Block *et al*., 2004). The introduction of fast food overseas has been accompanied by a similar increase in obesity in these countries (DeMaria, 2003). In Saudi Arabia, Rasheed *et al*. (1994) reported that 30.6% of female health college students were either overweight or obese.

Fast food consumption spread out rapidly in last ten years especially between teenagers and youth. The results from many studies showed that fast food consumption was higher among children and adolescent, young adults and people with higher income (Pereira *et al*., 2005).

It has been suggested that fast food may encourage soft drink consumption and associated with low intake of vegetables, fruits and milk in both adult and children (Paeratakul *et al*., 2003). Some studies have investigated the effects of fast food consumption on energy balance and body weight. It has found harmful sequences of these foods on health; like the associations between fast food intakes, frequencies of visits to fast food restaurant and increased weight gain, higher BMI and insulin resistance which will subsequently lead to increases in the risk of obesity and development of type 2 diabetes. Furthermore fast food consumption was associated with lower intakes of vegetables and fruits (Pereira *et al*., 2005; Astrup, 2005; Jeffery *et al*., 2006; Fraser *et al*., 2011).

The relationship between fast food, BMI and the pattern of food consumption in female college students with specialty in nutrition and food science was not studied well in literature. We expect that the association between fast food and BMI is different in this population as they were suppose to have knowledge in nutrition and less bad dietary habits. Therefore the aim of the present study is to investigate the relationship between consumption of some fast food, BMI, the frequency of eating fast food and the impact of the female student's specialty which is nutrition and food science on the consumption of fast food.

MATERIALS AND METHODS

This is a descriptive, questionnaire-based, cross sectional analysis study. One hundred and sixty students were interviewed. Nineteen were excluded because of either lack of enough information provided by them or lack of interest to participate. Total of 141 Saudi female students aged 18 to 26 years were included. The subjects were recruited from different levels of nutrition

and food science department at KSU. The study was explained to each subject who was provided with brief information about the study. Initially a pilot tested group of 20 subjects was performed. Face to face interview questionnaire was used. The questionnaire contains several data including information on demographic characteristics like age, height, weight, educational levels and information on consumptions patterns [consumption of fast food (French fries, chicken sandwich, meat sandwich, fish sandwich, nuggets, pizza, shawrma, apple pies and soft drink), frequency of consumption (number of days/week), portion size (super size or regular size), where they eat their meal in restaurants, home or university]. It also includes information on applying their basic nutrition scientific knowledge on their selection of food. Height was recorded to the nearest 0.5 cm and body weight was measured to the nearest 0.1 kg using electronic scale (Seca Weighing and Hight scale, Vogel and Halke Hambuy, Germany). BMI was derived from body weight divided by the square of body height in meters. The BMI was classified into six groups according to the National Institutes of Health (NIH) (National Institutes of Health, 1998). Group 1 underweight (BMI<18.5), group 2 normal weight (BMI = 18.5-24.9), group 3 overweight (BMI = 25-29.9) and group 4 obesity grade 1 (BMI = 30-34.9), group 5 obesity grade 2 (BMI = 35-39.9) and group 6 obesity grade 3 or extreme obesity (BMI≥40). There was no single definition of the term fast food and several definitions have been postulated. Kapica *et al.* (2006) have reviewed 55 epidemiologic studies; 10 of them have defined fast food as a specific restaurant or food item that they have used in their study, 8 defined it according to the kind of service provided, 6 defined it as the restaurant food or food from outside home and 31 did not have a specific definition. In our study we used a definition that was modified from different reported definitions that includes but not limited to eating from the famous western fast food restaurants chains like McDonald's, Kentucky Fried Chicken, Burger King, Pizza shops, etc. and the local chains of similar restaurants. Brand name fast food when compared with same type of traditional food does contain great amount of salt, fat and high in energy, all could have an important impact on development of obesity and risk for cardiovascular disease (Shankar *et al*., 2001; Pereira *et al*., 2005). Data were analyzed by using SPSS version 12. Descriptive data was obtained for all the parameters tested as percentage. For a comparison of categorical variables, chi-square, Pearson correlation tests and one way ANOVA test were used. The probability level of $p \leq 0.05$ was set for statistical significance.

RESULTS

A total of 141 female students participated in the present study. Mean age was 22 years. Table 1 represent the sociodemographic characteristics of the students which show that 17% of the students were overweight and 7.8% were obese. Consumption of fast food was; 30.5%, 44.7%, 16.3% and 8.49% among under weight, normal weight, overweight and obese students respectively (Table 2). Fast food frequency was in the range of 1-2 times per week in majority (74.5%) (Table 3). Our results revealed that large number of the students follow unhealthy food habits. Almost 50% of them ate chips, fried food, french fries, chicken shawrma (grilled pieces of chicken/meat mixed with salt and

Table 1: Sociodemographic characteristics of the students

Sociodemographic characteristics	No	(%)
Age		
18-20	70	49.6
21-23	63	44.7
24-26	7	5.0
Income (SR)		
1000-4000	30	21.3
5000-7000	26	18.4
8000-10000	55	39.0
More than 10000	25	17.7
BMI		
Group 1	43	30.5
Group 2	63	44.7
Group 3	24	17.0
Group 4	6	4.3
Group 5	3	2.1
Group 6	2	1.4
USL		
1st year	37	26.2
2nd year	36	25.5
3rd year	30	21.3
4th year	38	27.0
Total	141	100.0

SR: Saudi Riyal, USL: University Study Level

Table 2: Frequency of fast food consumption by classification of BMI category

	Frequency of fast food consumption/week							
	1-2		3-4		4-5			
BMI	%	N	%	N	%	N	%	Total
Group 1	28.3	30	37.5	12	33.3	1	30.50	43
Group 2	44.3	47	43.7	14	66.6	2	44.70	63
Group 3	16.9	18	15.6	5	-	-	16.31	23
Group 4	5.7	6	-	-	-	-	4.25	6
Group 5	1.9	2	3.1	1	-	-	2.12	3
Group 6	2.8	3	-	-	-	-	2.12	3
Total	75.2	106	22.7	32	2.1	3	100.00	141

Table 3: Frequency of consumption fast food/week

Frequency of consumption	No	%
1-2 times\ week	105	74.5
3-4 times\week	32	22.7
5 times or more	4	2.8
Total	141	100.0

Table 4: Knowledge about fast foods

Knowledge about fast foods	No	%
Unhealthy	121	85.8
I don't know	14	9.9
Healthy	3	2.1
Total	138	97.9
Reasons why fast food is unhealthy?		
High in fat	39	27.7
Low fiber	1	0.7
High fat, High sodium, Low fiber	1	0.7
High fat, low fiber	6	4.3
High fat, High energy	2	1.4
High fat, High energy, Low fiber	2	1.4
All of the above	70	49.6

mayonnaise paste) and drinking soft drink beverages. Fifty four percent of female students ate fast foods at home, 12.80% at restaurants and 9.20% at university (delivery). About 20% of students thought that they consumed more quantity when they ate in restaurants compared to eating at home or university. As show in Table 4, the majority (85.8%) of female students have the knowledge that fast foods are unhealthy. However only 49.6% knew that it's high in fat, sodium, energy and low in fiber, this in spite they study this information in their college. Our result showed that there was no significant relationship between consuming fast foods, frequency of consumption and BMI (Table 5). We found no significant relationship between portion size of all types of fast food meals consumed (chicken sandwich meal, meat sandwich meal, chicken nuggets, French fries, vegetable pizza, cheese pizza, apple pie, soft drinks, chicken shawrma and meat shawrma) and BMI, whereas there was a significant ($p \leq 0.05$) positive relationship between fish sandwich meal size and BMI (Table 6).

The result showed there are no significant relationship between university study level and the following parameters; amount of fast foods consumption, the knowledge that fast foods are unhealthy and BMI (Table 7). However, we found that there is a significant ($p \leq 0.05$) positive relationship between university study level and the knowledge in explaining why fast food is unhealthy. Also there was no observed significant relationship between family income and each of; the amount of consuming fast foods, the frequency of consumption and BMI.

Table 5: Correlation between average consumption fast foods and BMI

	BMI		BMI		
Variables	Pearson correlation	p-value	Chi-Square	df	p-value
Consumption of fast food	-0.065	0.512	11.551	10	0.316
Frequency of consumption fast food/week	-0.119	0.160	4.410	10	0.927

Frequency: Number/week. Consumption: Eating

Table 6: The relationship between the frequency and meal size of selected fast food consumption and BMI

		BMI	
Variable		Pearson correlation	p-value
Chicken sandwich meal	Size	0.077	0.392
	Times/week	0.018	0.849
Meat sandwich meal	Size	-0.116	0.371
	Times/week	0.078	0.584
Fish sandwich meal	Size	0.347	0.029
	Times/week	-0.080	0.670
Chicken nuggets	Size	0.215	0.111
	Times/week	-0.044	0.769
French fried	Size	-0.019	0.839
	Times/week	-0.151	0.125
Vegetable pizza	Size	-0.013	0.898
	Times/week	-0.145	0.172
Cheese pizza	Size	0.012	0.904
	Times/week	-0.085	0.432
Apple pie	Size	-0.058	0.739
	Times/week	0.152	0.467
Soft drink beverages	Size	0.129	0.183
	Times/week	-0.113	0.276
Chicken shawrma	Size	0.049	0.646
	Times/week	-0.008	0.947
Meat shawrma	Size	0.159	0.333
	Times/week	0.086	0.646

Table 7: Correlation between university study level and different variables using one way ANOVA

Variables	F	df	Sig.
Amount of fast foods consumption	0.363	3	0.780
Knowledge that fast food unhealthy	0.701	3	0.553
Reasons for agreement that fast food unhealthy	10.028	3	0.000
BMI	1.413	3	0.242

DISCUSSION

Our study showed no correlation between fast food consumption and BMI, which was in agreement with Haines *et al.* study (2007). The present data demonstrated that 25% of the students were overweight or obese. These finding are consistent with few studies which were carried out in Saudi Arabia on the prevalence of obesity and overweight in the general population which has been reported to be high in both males and females ranging between 20.6%-64.3% in female (Khashoggi *et al.*, 1994; Rasheed *et al.*, 1994; EL-Hazmi and Warsy, 1997; Al-Rethaiaa *et al.*, 2010). Some of these studies were carried out on people attending health care centers and only 2 studies have reported results from medical and nursing students (Rasheed *et al.*, 1994; Al-Rethaiaa *et al.*, 2010). The frequency of eating at fast-food restaurants was positively associated with poor self-rated health, weak belief in a diet-cancer relationship, low self-efficacy for healthy eating, weight dissatisfaction and perceived difficulties of preparing healthy meals and ordering healthy foods in restaurants (Yoon *et al.*, 2001). The frequent consumption of fast foods is one of the main reasons for high intake of saturated fatty acid and trans fatty acids which partially come from using hydrogenated vegetable oil (Mario Fernandez and Juan, 2000). This class of fatty acids can cause insulin resistance and predispose to type 2 diabetes (Pereira *et al.*, 2005).

Many studies have reported that adults who consume fast food have significantly lower intake of more healthful nutrients such as bread, cereals, grains, milk and legumes (French *et al.*, 2000; French *et al.*, 2001; Paeratakul *et al.*, 2003; Al-Rethaiaa *et al.*, 2010). Our study showed that 85.8% of the female students knew that fast foods are unhealthy, which was expected since they are studying nutrition and have the information about harmful effect of these foods. Result from this study showed that there is a significant ($p \leq 0.05$) positive correlation between university study level and the knowledge in explaining why fast food is unhealthy; as we found that progression in education to higher level will be associated with decrease in consumption of fast food. Students with 4 or more years of college education showed lower fast food consumption compared with those with early levels of college education, this is in agreement with other study by Paeratakul *et al.* (2003). More than half of our subjects eat fast food at home, this high rate of fast food consumption at home could be due to the convenience of ordering and delivery of fast food to home compared to either at university or going to restaurants. The limitation of our study is the relatively small sample size. The advantage of our study is that we have examined the existence of this important dietary health problem in a unique group of female students with background knowledge in nutrition. Furthermore we have performed a face-to-face questionnaire and avoided the self-administered questionnaire in order to clarify any misunderstanding questions, prevent low response and minimize the possible bias.

In conclusion, our study showed that there is no significant relationship between consuming fast foods, frequency of consumption and BMI. Data shows that 25% of female students were overweight and obese. There is a significant positive relationship between increase in size of fish sandwich meal and increase of BMI. Moreover, positive relationship between university study level and the knowledge in explaining why fast food is unhealthy. Frequency of consumption fast food was high among students as they consume fast food 1-2 times per week. Also the study showed that college students consumed unhealthy food. We suggest that if it is necessary to eat fast food, then choosing the lower-fat items that are available at many fast food locations may help in reducing the excess energy intake associated with high-fat items. Additional data, especially longitudinal data are needed to examine the relationship between fast food and BMI on large sample of subjects.

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