

Food Science and Nutrition

REGULAR ARTICLE

Nutritional knowledge of Emirati traditional foods and body image perceptions among UAE University students

A. S. Al Dhaheri^{1*}, A. K. Al Ma'awali¹, L. C. Laleye² and S. A. Washi¹

¹*Nutrition and Health Department, College of Food and Agriculture, United Arab Emirates University, Al Ain, United Arab Emirates*

²*Department of Biotechnology, Faculty of Technology, Maharakham University, Maharakham, Thailand*

Abstract

In the United Arab Emirates, dietary habits and lifestyles have undergone recent changes. To investigate the nutritional knowledge and body image perceptions among young people, a cross-sectional questionnaire was administered to UAE University students (n=304; 150 females). Measures included frequency of consuming Emirati traditional foods, reasons for their consumption, knowledge of their nutritional value, and body image perceptions. Forty-six percent of females consumed traditional foods one to two times a week; 32.5% of males consumed the foods three to four times a week; both genders cited taste as the primary reason for this choice. 69% of males and 47% of females considered traditional foods as healthy. However, the majority characterized these foods as high in fat. Also, 42.2% of males and 21.3% of females were either overweight or obese. Males tended to underestimate and females tended to overestimate their actual BMI. Understanding individuals' nutritional evaluation of traditional foods is essential for clarifying the relationship between dietary intake and chronic obesity and diabetes in the UAE population. Interventions to improve adolescents' and young adults' knowledge of body weight and its relationship to chronic disease risk factors are needed.

Key words: Body mass index, Dietary habits, Emirati foods, Self-image, University students

Introduction

Obesity in young adults is mainly attributable to consumption of unhealthy foods and a sedentary lifestyle (Wate et al., 2013; Whitzman et al., 2010). Eating practices that contribute to obesity and diabetes are reported to include missing breakfast and excessive consumption of unhealthy snacks; these behaviors result in intake of heavy meals later in the day (Musaiger, 2007). In the Gulf region, there are few studies related to recent changes in dietary habits and lifestyle. In Bahrain, Musaiger et al. (2012) reported that females were significantly more likely to skip breakfast than were males (62.8% versus 37.2%). Musaiger and colleagues also found that a majority of adolescents snacked on unhealthy foods during school break time (Musaiger et al., 2011). In the United Arab

Emirates (UAE), a recent shift has occurred toward such habits as consumption of fast foods and of high-energy foods that are easy to procure (bin Zaal et al., 2009). The omission of breakfast and the consumption of fast food among girls in the UAE have been significantly related to the high prevalence of obesity, while fruit consumption has been reliably associated with a lower risk of obesity among boys (bin Zaal et al., 2009). Kerkadi (2003) showed that the frequency of fast food consumption was related to the risk of obesity in female students of UAE University. This study also reported that 45% of students skipped breakfast and 34.9% of female students consumed junk food at least once a week.

There have been similar trends in relation to obesity prevalence among Gulf countries such as Saudi Arabia (Al-Othaimeen et al., 2007) and Kuwait (Al-Kandari, 2006). One study (Popkin & Gordon-Larsen, 2004) has confirmed the important role that changing dietary behavior may play in reducing the prevalence of noncommunicable diseases. But cultural considerations also influence lifestyle and behavior (Donnelly et al., 2011). The current dietary patterns among the UAE population

Received 31 July 2014; Revised 07 September 2014; Accepted 08 September 2014; Published Online 14 September 2014

*Corresponding Author

A. S. Al Dhaheri
Nutrition and Health Department, College of Food and Agriculture, United Arab Emirates University, Al Ain, United Arab Emirates

Email: ayesha_aldhaheri@uaeu.ac.ae

incorporate many Western foods; however, traditional foods still constitute a large percentage of the diet (Habib et al., 2011). Therefore, there is an increased need to study the specific cultural effects of the diet in increasing the incidence of noncommunicable diseases in the Gulf countries.

Poor nutritional knowledge, misperception of body image, and erroneous beliefs about obesity is negatively associated with the treatment, management, and prevention of obesity (Al-Sendi et al., 2004). Numerous studies have documented that beliefs and perceptions about obesity significantly influence individuals' behaviors, attitudes, and lifestyles (Fagan et al., 2008). Several important studies have indicated that men are more likely than women to underestimate their body weight (Gee et al., 2013; Joh et al., 2013); conversely, women tend to overestimate it (Linder et al., 2010; Park, 2011). Accurate identification of body weight is important because it is one of the management and prevention tools for obesity.

Several factors have been identified as risk indicators for obesity, such as genetics, age, race, sedentary lifestyle, excessive medications, and unhealthy dietary habits (Berk et al., 2013). Poor nutritional knowledge and inaccurate beliefs about overweight and obesity are also contributing factors. In the Gulf countries in general and the UAE specifically, there is a dearth of nutritional research related to the shift in consumption from traditional foods to Western-type 'fast foods.' Therefore, understanding food habits and nutritional knowledge in relation to the consumption of Emirati traditional foods is critical. The objectives of this study were to assess the rate of consumption of Emirati traditional foods and the reasons for consuming these foods, and to investigate individuals' nutritional knowledge in relation to body image, beliefs, and perceptions.

Materials and Methods

Ethical approval for the study protocol was obtained from the Scientific Research Ethics Committee at UAE University (UAEU), and all subjects gave written informed consent to participate. Subjects were given full details of the study protocol with the opportunity to ask questions.

All subjects were recruited from UAEU as voluntarily participants. Two methods were used for recruitment: email circulation and posters displayed in different buildings of the university. Three hundred and four male and female students aged between 16 and 28 years were recruited to

complete a self-reported questionnaire. The questionnaire solicited demographic information (gender, marital status, age, and nationality), frequency of consumption of Emirati traditional foods, reasons for consuming these foods, and nutritional knowledge in relation to body image, beliefs, and perceptions about obesity. Measurements were made of each participant's height (cm) using a stadiometer (Seca Ltd, Birmingham, UK) (Gibson, 2005) and body weight (kg) using a Segmental Body Composition Analyzer (TBF-410 MA; Tanita Corp., Tokyo, Japan) (Chang et al., 2013). Body mass index (BMI) was calculated as the weight in kilograms divided by the square of the height in meters— $BMI = \text{weight (kg)} / \text{height}^2 (\text{m}^2)$ —using cutoff values for normal weight, overweight, and the various levels of adult obesity identified by the World Health Organization (WHO, 2014).

Power analysis

A power analysis was performed using Java applets for power and sample size. In the questionnaire, the sample size of 304 respondents allowed for an error rate of less than or equal to 6% in estimation of population percentages (adult subjects aged 16 to 28 years).

Statistical analysis

All statistical calculations were carried out using SPSS for Windows 'Statistical Product and Service Solutions' (SPSS Inc., Chicago, IL, USA), version 20.0. Where necessary because of sample size, the chi-square test was used to test the association between categorical variables such as the actual BMI categories and the perceived BMI categories. The independent samples t-test was used to compare the quantitative demographic variables (e.g., height, weight, and BMI) of males and females. Paired samples t-tests were used to compare the actual versus perceived BMI for each gender. Statistical significance was set at $P < 0.05$.

Results

Study population characteristics

Table 1 shows study sample characteristics. Nearly two-thirds of subjects (65.6% of males and 59.3% of females) were UAE nationals. A further 30.7% of females and 9.1% of males came from the Gulf Cooperation Council (GCC) countries. The vast majority of subjects (95.5% of males and 94.7% of females) were single. The average BMI for males was $(24.7 \pm 4.4 \text{ kg/m}^2)$ and for females was $(23.1 \pm 4.1 \text{ kg/m}^2)$ ($P < 0.05$ for the gender difference).

Table 1. Demographics and characteristics of the study population.

Variable	Count (Percentage)		P-value
	Male (N=154)	Female (N=150)	
Age Group (years)			
16 – 20	87 (56.5)	69 (46.0)	.056
21 – 24	64 (41.6)	70 (46.7)	
25 – 28	3 (1.9)	8 (5.3)	
> 28	0 (0)	3 (2.0)	
Marital Status			
Single	147 (95.5)	142 (94.7)	.589
Married	7 (4.5)	8 (5.3)	
Nationality			
UAE	101 (65.6)	89 (59.3)	.001
GCC	14 (9.1)	46 (30.7)	
Other Arab countries	38 (25.3)	15 (10.0)	
Anthropometry			
Height (cm ²)	173.1 ±77.6	159.4 ±55.7	.001
Weight (kg)	74.5 ± 14.4	58.8 ±811.8	.001
BMI (kg/m ²)	24.7 ±44.4	23.1 ±34.1	.001

Significant at $P < 0.05$

Frequency of consumption of Emirati traditional meals

The frequency of consumption was divided into four categories: (a) never, (b) one to two times a week, (c) three to four times a week, and (d) daily (Figure 1). As the figure shows, the predominant consumption frequency was one to two times per week, reported by 46.0% of females. A sizable

minority (18.2% of males and 14.0% of females) cited daily consumption rates. About one-third (32.5%) of male subjects and one-quarter (24.7%) of female subjects were consuming traditional meals three to four times a week, with a strong tendency towards statistical significance between both genders ($P = 0.051$).

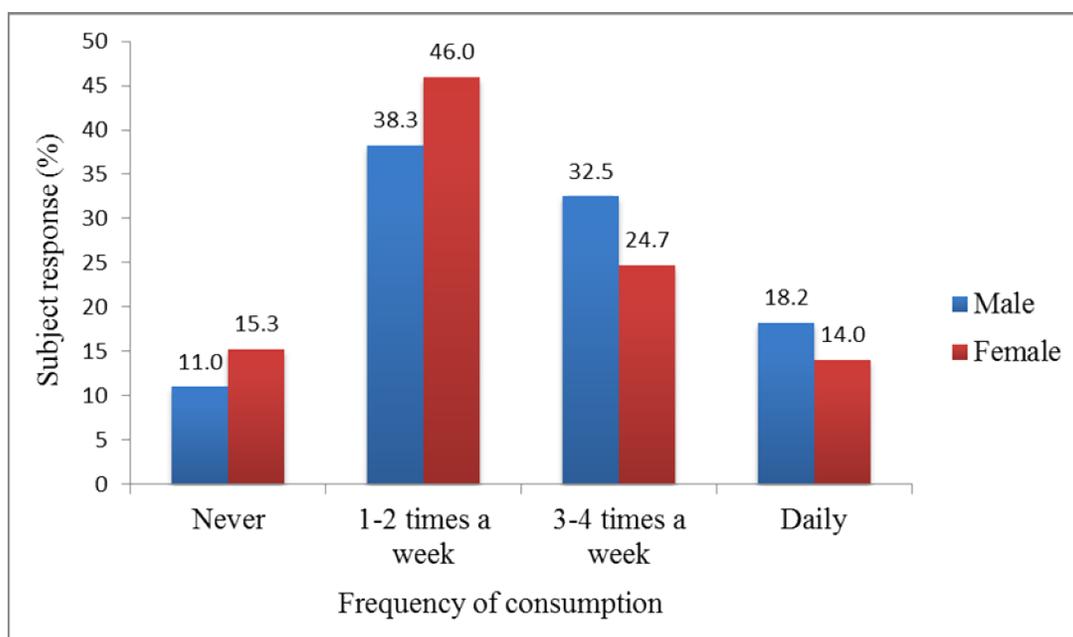


Figure 1. Consumption frequency of Emirati traditional foods.

Reasons for preferred consumption of Emirati traditional foods

Figure 2 shows the reasons subjects chose for their consumption of Emirati traditional food. Taste was by far the most popular reason, with 64.9% of males and 52.0% of females citing it as the primary reason. Also, traditional food was consumed as a means of eating with the family for a large minority of subjects (27.3% of females and 16.2% of males). Cleanliness of food preparation was another reason (cited by 10.7% of females and 10.4% of males).

In contrast, the healthy nature of the food and its cost were the least frequently chosen reasons for both genders, which almost reached statistical significant ($P = 0.06$).

Levels of agreement/disagreement that Emirati traditional foods are healthy or unhealthy

Table 2 shows the level of agreement and disagreement regarding the nutritional value of traditional foods. A large percentage of subjects (68.8% of males and 47.4% of females, $P = 0.001$) agreed that Emirati traditional foods are healthy, while a much smaller percentage (4.7% of females and 3.2% of males) strongly disagreed with that statement. Subjects were also asked to rate their level of agreement with the statement that ‘Emirati traditional foods are unhealthy foods.’ Both genders (32.5% of males and 42.0% of females, $P = 0.025$) tended to disagree with labeling the traditional foods as unhealthy. Only 7.1% of males and 12% of females agreed that these foods are unhealthy foods.

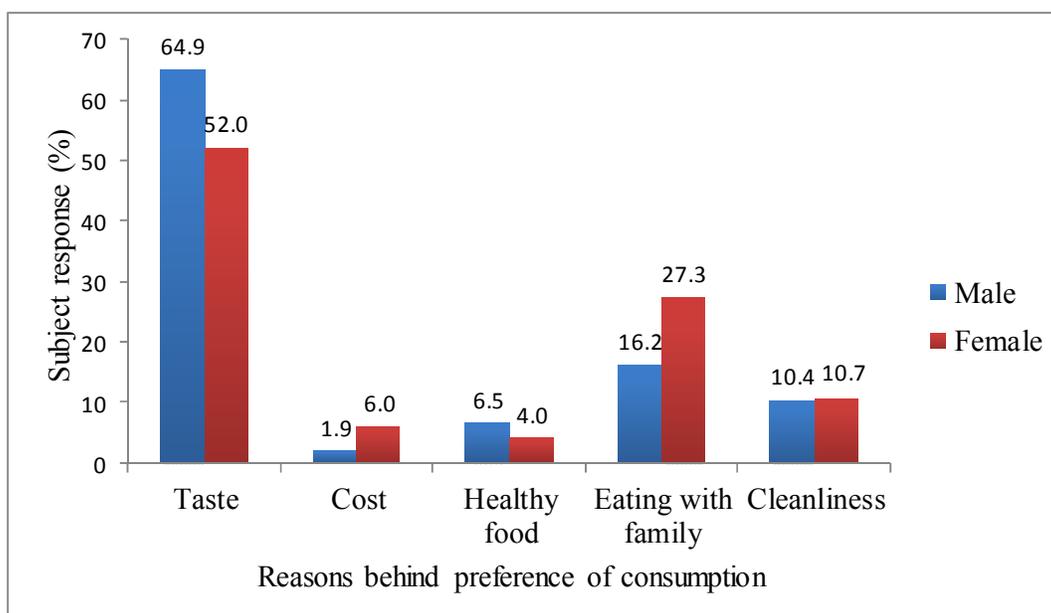


Figure 2. Factors affecting the consumption of Emirati traditional foods.

Table 2. Levels of agreement/disagreement with rating Emirati traditional foods as healthy or unhealthy foods.

		Count (Percentage)		P-Value
		Male (N=154)	Female (N=150)	
Emirati traditional foods are healthy	Strongly agree	13 (8.7)	45 (29.2)	0.001
	Agree	58 (38.7)	61 (39.6)	
	Neutral	51 (34.0)	33 (21.4)	
	Disagree	21 (14.0)	10 (6.5)	
	Strongly disagree	7 (4.7)	5 (3.2)	
Emirati traditional foods are unhealthy	Strongly agree	5 (3.3)	9 (5.8)	0.025
	Agree	18 (12.0)	11 (7.1)	
	Neutral	53 (35.3)	45 (29.2)	
	Disagree	63 (42.0)	50 (32.5)	
	Strongly disagree	11 (7.3)	39 (25.3)	
P-Value		0.001	0.001	

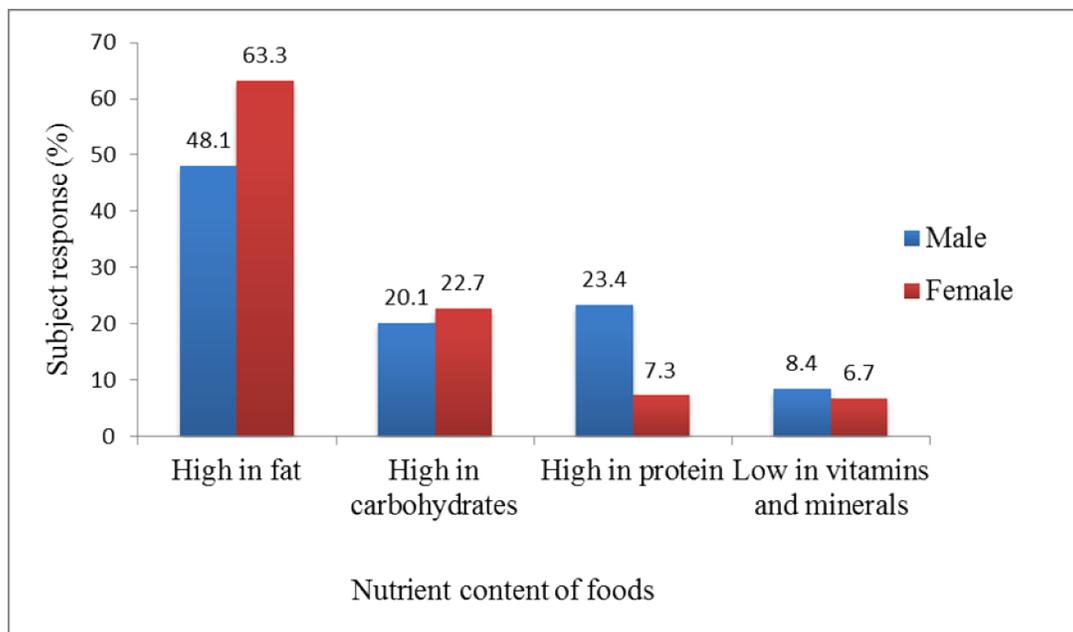


Figure 3. Subjects' evaluation of the nutrient content of Emirati traditional foods.

Subjects' basic assessment of the nutrient content of Emirati traditional foods

All subjects were asked to assess the nutrient content of traditional foods. Figure 3 illustrates the results. The available choices were: (a) high in fat; (b) high in carbohydrates; (c) high in protein; and (d) low in vitamins and minerals. The majority of subjects (48.1% of males and 63.3% of females) considered traditional foods to be high in fat. In addition, about 8.4% of males and 6.7% of females rated these foods as low in vitamins and minerals.

Subjects' responses regarding improvements to the nutritional value of the Emirati traditional foods

Figure 4 shows the subjects' suggestions for improving the nutritional value of traditional meals. The available categories for nutritional improvement were: (a) add salad and fruits; (b) decrease fat in cooking; (c) decrease sugar in cooking; (d) prepare food with less salt; and (e) use wholegrain ingredients. Reduction of fat in cooking was the most frequently advocated suggestion, with 38.3% of males and 56.0% of females choosing this option. This supports the finding displayed in Figure 3, where the majority of subjects considered the traditional foods to be high in fat. Apart from fat content, 43.5% of males and 29.3% of females suggested the addition of salad and fruits to the

traditional foods. A small minority (9.3% of females and 5.2% of males) suggested the addition of wholegrain ingredients to the traditional meal recipes. Similarly, few subjects suggested decreasing the sugar (6.9% of males and 4.0% of females) and salt (6.9% of males and 1.3% of females) content of the traditional meals.

Calculated BMI and self-perceived BMI

Table 3 displays summary data on the calculated and perceived BMI for male and female subjects. Females were more often underweight (10.7%) than were males (5.2%). While 68% of the females had normal BMI values, only 52.6% of males did. Nearly a third of the male subjects (30.5%) were classified as overweight, compared with just 15.3% of the female subjects. In addition, 11.7% of males were falling into the obese category. A small percentage of males (16.2%) and females (10.7%) perceived their BMI as underweight. The perceived values for normal BMI were 49.4% for males and 60.0% for females. About 33.8% of the males thought of themselves as overweight, whereas 25.3% of females considered themselves overweight. However, 4.0% of female subjects assumed that they were obese, while only 0.6% of male subjects considered themselves obese.

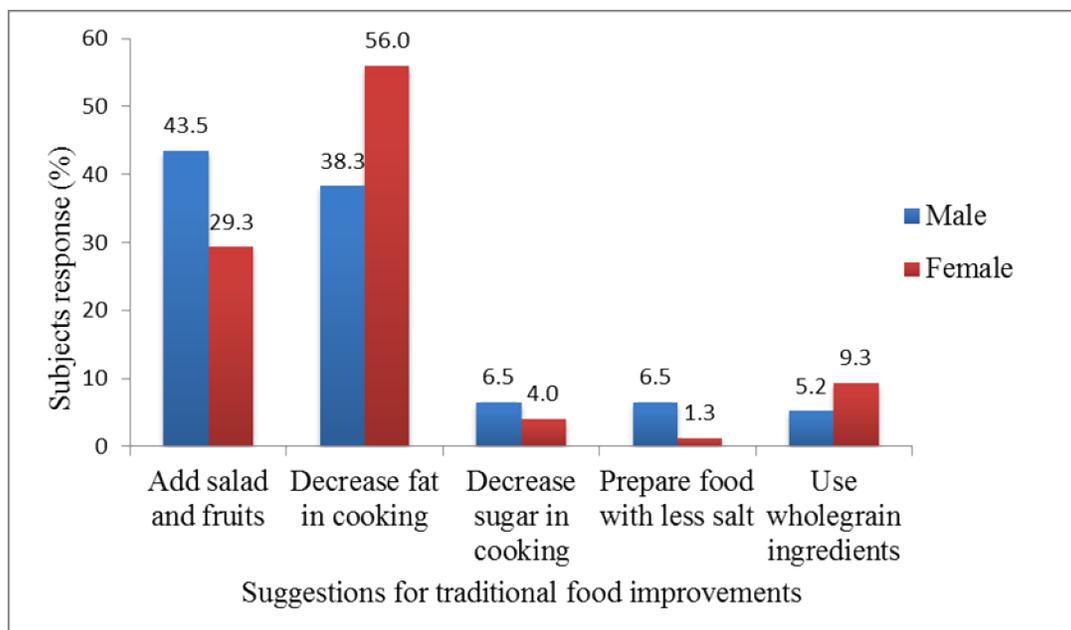


Figure 4. Subjects' suggestions for the improvement of Emirati traditional foods.

Table 3. Calculated and self-perceived BMI for males and females subjects.

		Count (Percentage)		P-Value
		Male (N=154)	Female (N=150)	
Actual BMI	Underweight	8 (5.2)	16 (10.7)	.001
	Normal weight	81 (52.6)	102 (68.0)	
	Overweight	47 (30.5)	23 (15.3)	
	Obese	18 (11.7)	9 (6.0)	
Self-Perceived BMI	Underweight	25 (16.2)	16 (10.7)	.631
	Normal weight	76 (49.4)	90 (60.0)	
	Overweight	52 (33.8)	38 (25.3)	
	Obese	1 (0.6)	6 (4.0)	
P-Value		.001	.001	

Significant at $P < 0.05$

Discussion

The result from the current study showed high frequency of consumption of Emirati traditional foods for both genders (one to two times per week). This high frequency for consumption was due to the taste of the traditional foods, as well as a belief on the part of both genders that these foods are healthy options in terms of their nutritional quality. Conversely, the majority of subjects considered the traditional foods to be high in fat. To improve the nutritional value of the traditional foods, subjects suggested decreasing the amount of fat in cooking, as well as adding salad and fruits to the traditional

food. Major nutritional problems among adolescents and young adults include unhealthy lifestyles, such as irregular meals with inadequate intake of essential food groups, excessive consumption of fast food, and inadequate nutritional knowledge. A previous study (Habib et al., 2011) has noted that the frequency of consumption of traditional foods is high in the Gulf region.

The relationship between overall health status and the nutrient content of food has been emphasized in numerous studies. A review by Doyle and Glass (2010) on sodium reduction and its effect on food safety, food quality, and human

health highlighted the correlation between adding salt and adverse effects on health. Similarly, a preponderance of evidence exists on the statistical and clinical importance of reducing total dietary fat intake. Interestingly, subjects from the current study did not consider reducing salt content in traditional foods would improve the nutritional value of the diet.

Our study also showed that the prevalence of underweight among females was twice that of males. In addition, 42.2% of male and 21.3% of female subjects were either overweight or obese. These rates are higher than those reported in a previous study conducted with the same population. Just over a decade ago, Kerkadi (2003) found a prevalence of 16.1% of overweight and obesity in females studying at UAEU. The subsequent increase might be due to the unhealthy dietary habits and limited nutritional knowledge related to overweight and obesity risk factors.

The discrepancy between perceived and calculated BMI category was significant ($P = 0.001$) for both genders. The results confirmed that subjects had low knowledge of their BMI status, body image, and related obesity perceptions.

As mentioned previously, the prevalence of underweight was higher among female (10.7%) than male (5.2%) subjects. However, when subjects were asked to classify themselves into a BMI category, males more often thought they were underweight than females did (16.2% versus 10.7%). Interestingly, a quarter of female subjects considered themselves overweight, although only 15.3% of them actually met the overweight criterion. However, for the male subjects a reverse trend was observed, with 0.6% considering themselves obese when 11.7% were objectively classified as such. Hence, our data suggest that males tend to underestimate and females to overestimate their actual BMI status.

Excessive body weight and related health problems can be reduced through nutritional counseling and interventions pointing individuals who are likely to undervalue their weight status. In California, around 36.6% of overweight and obese adolescents tend to underestimate their weight status (Gee et al., 2013). In 2011, a study reported that weight overestimation is more likely to be seen in girls than boys who tend to misjudge their weight (Park, 2011). Park's results mirror the findings from our study.

A few important studies have been conducted in the UAE on perceptions and beliefs about overweight and obesity. Results of a cross-sectional study of 203 female university students in the UAE

by Musaiger and Radwan (1995) indicate that 80% of overweight students' perceptions of their body weight were accurate, whereas a majority of underweight students' perceptions were inaccurate. A high percentage of these university students claimed no knowledge of their weight and height measurements but were shown to have perceptions of their physical shape. The authors note that their findings are similar to those of a study conducted in Bahraini adolescents (Al-Sendi et al., 2004).

Being overweight (BMI ≥ 25) or obese (BMI ≥ 30) is known to be a major risk factor for chronic disabling diseases such as diabetes mellitus, cardiovascular diseases, and cancer (WHO, 2013). Therefore, the inability of adolescents and young adults to perceive their weight accurately may be a major obstacle to promoting lifestyle changes in this group.

Conclusions

A high prevalence of overweight and obesity among study subjects, combined with low levels of knowledge about body weight and the nutritional values of traditional food was observed. Consequently, interventions to improve dietary knowledge and understanding of the relationship between body weight and chronic disease risk are required. In consequence of low knowledge of the study subjects' self-BMI status, body image, and related obesity perceptions, information about physical activity choices should be made available to adolescents and young adults.

The study was able to compare the different factors affecting the consumption of Emirati foods between male and female students. However, the limitations of the study lie upon the small-scale of the sample size and focus only on one university population. Moreover, the study can lead to a national scale of nutritional evaluation of traditional foods by scientists, which is a critical step in clarifying the relationship between dietary intake and prevalence of chronic disease in the UAE population.

Acknowledgments

The authors would like to thank their students for their participation as subjects in the study.

References

- Al-Kandari Y. Y. 2006. Prevalence of obesity in Kuwait and its relation to sociocultural variables. *Obes. Rev.* 7(2):147-154.
- Al-Othaimen, A. I., M. Al-Nozha and A. K. Osman. 2007. Obesity: an emerging problem in Saudi Arabia. Analysis of data from the

- National Nutrition Survey. *East. Mediterr. Health J.* 13(2):441-448
- Al-Sendi, A. M., P. Shetty and A. O. Musaiger. 2004. Body weight perception among Bahraini adolescents. *Child Care Health Dev.* 30(4):369-376.
- Berk, M., J. Sarris, C. E. Coulson and F. N. Jacka. 2013. Lifestyle management of unipolar depression. *Acta. Psychiatr. Scand. Suppl.* 443:38-54.
- bin Zaal, A. A., A. O. Musaiger, R. D'Souza. 2009. Dietary habits associated with obesity among adolescents in Dubai, United Arab Emirates. *Nutr. Hosp.* 24(4):437-444.
- Chang, C. I., C. Y. Chen, K. C. Huang, C. H. Wu, C. A. Hsiung, C. C. Hsu and C. Y. Chen. 2013. Comparison of three BIA muscle indices for sarcopenia screening in old adults. *Eur. Geriatric Med.* 4(3):145-149.
- Donnelly, T. T., J. Al Suwaidi, A. Al Bulushi, N. Al Enazi, K. Yassin, A. M. Rehman, A. A. Hassan and Z. Idris. 2011. The influence of cultural and social factors on healthy lifestyle of Arabic women. *Avicenna.* Vol. 2011:3.
- Doyle, M. E. and K. A. Glass. 2010. Sodium reduction and its effect on food safety, food quality, and human health. *Compr. Rev. Food Sci. Food Safety* 9(1):44-56.
- Fagan, B. H., J. Diamond, R. Myers and J. M. Gill. 2008. Perception, intention, and action in adolescent obesity. *J. Am. Board Fam. Med.* 21(6):555-561.
- Gee, L., R. Peebles, A. Storfer-Isser, N. H. Golden and S. M. Horwitz. 2013. Underestimation of weight status in Californian adolescents. *Child Obes.* 9(2):132-136.
- Gibson, R. S. 2005. *Principles of Nutritional Assessment.* 2nd Ed. New York, USA: Oxford University Press.
- Habib, H. M., H. I. Ali, W. H. Ibrahim and H. S. Afifi. 2011. Nutritional value of 10 traditional dishes of the United Arab Emirates. *Ecol. Food Nutr.* 50(6):526-538.
- Joh, H. K., J. Oh, H. J. Lee and I. Kawachi. 2013. Gender and socioeconomic status in relation to weight perception and weight control behavior in Korean Adults. *Obes. Facts.* 6(1):17-27.
- Kerkadi, A. 2003. Evaluation of nutritional status of United Arab Emirates University female students. *Emir. J. Agric. Sci.* 15(2):42-50.
- Linder, J., L. McLaren, G. L. Siou, I. Csizmadia and P. J. Robson. 2010. The epidemiology of weight perception: perceived versus self-reported actual weight status among Albertan adults. *Can. J. Public Health.* 101(1):56-60.
- Musaiger A. O. 2007. Overweight and obesity in the Arab Countries: the need for action. Arab Center for Nutrition. Bahrain.
- Musaiger, A. O., H. R. Takruri, A. S. Hassan and H. Abu-Tarboush. 2012. Food-based dietary guidelines for the Arab Gulf countries. *J. Nutr. Metab.* 2012:905303.
- Musaiger, A. O. and H. M. Radwan. 1995. Social and dietary factors associated with obesity in university female students in United Arab Emirates. *J. R. Soc. Health.* 115(2):96-99.
- Park, E. 2011. Overestimation and underestimation: adolescents' weight perception in comparison to BMI-based weight status and how it varies across socio-demographic factors. *J. Sch. Health.* 81(2):57-64.
- Popkin, B. M. and P. Gordon-Larsen. 2004. The nutrition transition: worldwide obesity dynamics and their determinants. *Int. J. Obes. Relat. Metab. Disord.* 28 Suppl 3:S2-S9.
- Wate, T., W. Snowdon, L. Millar, M. Nichols, H. Mavoia, R. Goundar, A. Kama and B. Swinburn. 2013. Adolescent dietary patterns in Fiji and their relationships with standardized body mass index. *Inter. J. Behav. Nutr. Phys. Act.* 10:45.
- Whitzman, C., V. Romero, M. Duncan, C. Curtis, P. Tranter and M. Burke. 2010. Links between children's independent mobility, active transport, physical activity and obesity: evidence policy and practice. Wiley-Blackwell, Oxford, UK.
- World Health Organization (WHO). 2014. BMI Classification. Available: <http://www.who.int/mediacentre/factsheets/fs311/en/>. Accessed 20 July 2014.
- World Health Organization (WHO). 2013. Obesity. Available from: <http://www.who.int/topics/obesity/en/>. Accessed 20 July 2014.