



Food Consumption Patterns of Female Undergraduate Students in the United Arab Emirates

Types De Nourriture Consommee Chez Les Etudiants Du College Aux Emirats Arabes Unis

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ABSTRACT

BACKGROUND: Studies on food intake in the UAE especially in relation to the student life are lacking.

OBJECTIVE: To investigate eating habits of undergraduate students.

METHODS: A cohort of 146 undergraduate students studying Physiology at Zayed University completed a semi-structured questionnaire. A student response was accepted for analysis only those weeks with adequate responses not more than six.

RESULTS: The mean student age was 19.28 (1.22) years with a minimum-maximum 18–23 years. The mean weight was 56.67(13.31) with a minimum-maximum of 40–89 kg. Of 1,250 United Arab Emirates Dirham; 10 indicated they worked but did not specify income; and three were married. More foods were consumed seven times in a week. Amongst the principal foods consumed were: bread, cereal, starch; white bread, cornflakes and rice; fruits – apple, banana and orange; vegetables – cucumber, tomato and lettuce; meat – fish, chicken and beef; and eggs and dairy – (milk, cheese and yoghurt).

CONCLUSION: Dubai female undergraduates have a height intake of milk and fruits and less fanciful breads. Further studies should measure the exact quantity/mass of foods consumed per week. *WAJM 2011; 30(1): 42–46.*

Keywords: Food, nutrition, Students, undergraduate, University, UAE.

RÉSUMÉ

CONTEXTE: L'insuffisance d'études sur le type d'aliments consommés aux Emirats Arabes Unis en particulier chez les étudiants est établie.

OBJECTIF: Analyser les habitudes alimentaires des étudiants
METHODES: Un questionnaire a été administré à une cohorte de 146 étudiants inscrits en Physiologie à l'Université de ZAYED. La réponse d'un étudiant était acceptée pour analyse sur les semaines où une réponse adéquate est obtenue sur six semaines ;

RESULTATS : La moyenne d'âge des étudiants était de 19.28 (1.22) pour des extrêmes de 18 et 23 ans. Le poids moyen était de 56.67 (13.31) avec des extrêmes allant de 40 et 89 kg. A partir de 1250 Dirham des EMIRATS Arabes Unis, dix ont indiqué travailler mais n'ont pas précisé le montant des revenus ; Trois étaient mariées. Plus d'aliments était consommé sept fois en une semaine. Les aliments les plus consommés étaient les suivants : pain, céréales, amidon, pain blanc, cornflakes, riz. Des fruits: pomme, banane, orange ; Des légumes :concombre, tomate, laitue ; De la viande, du poisson, poulet, bœuf, des œufs, et des produits laitiers comme le lait,, le fromage, et le yoghurt

CONCLUSION : Les étudiantes de Dubai consomment plus de fruits et de lait et moins de pain. Des études supplémentaires pourraient préciser la quantité exacte de nourriture consommée dans la semaine. *WAJM 2011; 30(1): 42–46.*

Mots-cles: Nourriture, nutrition, étudiant, université, emirats arabes unis.

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Abbreviations: NSPH, Natural Science and Public Health; UAE, United Arab Emirates.

INTRODUCTION

Within the Islamic countries, studies on nutrition amongst university students have been completed in Kuwait¹ and Egypt.² Dubai is located on the Eastern coast of the Arabian Peninsula, in the south west corner of the Arabian Gulf. Its geographical coordinates are 25° 15' 8" North, 55° 16' 48" East. Dubai, with an area of 3,885 km², it is the second largest emirate in the United Arab Emirates (UAE). Dubai was founded in 1833, and by the turn of the 20th century became a successful port. The 1930s saw Dubai's population rose to nearly 20,000, a quarter of whom were expatriates. Sheikh Zayed bin Sultan Al Nahyan, then ruler of Abu Dhabi, and Sheikh Rashid bin Saeed Al Maktoum had dreamed of creating a federation of the Emirates in the region. Their dreams were realized in 1971 when Dubai, Abu Dhabi, Sharjah, Ajman, Umm Al Quwain, Fujairah and, in 1972 Ras Al Khaimah, joined to create the United Arab Emirates.

Zayed University was established in 1998 by the federal government of the United Arab Emirates to educate UAE women nationals. It has campuses in Abu Dhabi and Dubai under a single administration, and offers similar programmes on both campuses. Zayed University currently enrolls about 3,200 women nationals. Zayed University is based on an international model of higher education. It is organized academically into five colleges, one of which is the College of Arts and Sciences, under which the Department of Natural Science and Public Health (NSPH) falls.

There are potentially many significant aspects to consider for nutrition and diet, and anthropometry in students living in an affluent society. A study carried out at UAE University in 1995 showed that female students at the University who consumed large quantities of crisps and junk food were more likely to suffer from obesity. The same study also showed a large proportion of the females who took part in the study had higher BMI compared to their counterparts in the USA.³

Food portions may be affected by size of meal and be associated with energy and nutritional content.⁴ Methodologies used include a comparison of

the quantity of food with energy intake such that a clear indication of food portion size is derived.⁴ Nutrition knowledge has also been assessed within food groups, healthy foods and as food functions.⁵ Cross-sectional studies to compare the differences in knowledge and lifestyle among undergraduate students using a self-reported questionnaire showed that superior knowledge about healthy lifestyle is not necessarily associated with improved dietary intake.⁶

As studies on food intake in UAE are lacking, we felt it was important to determine the average nutritional intake as one component in the quality of university student life. We therefore devised a simple semi-structured questionnaire as an extension of the study by Merchant *et al.*⁷ in order to assess how balanced diet of students in Zayed University were. The students who took part in this study were enrolled on one of the following majors: nutrition, health education or environmental health. The aim of this study was to investigate the number of times per week different food categories were consumed by students studying these health sciences.

SUBJECTS, MATERIALS, AND METHODS

Study site/ location: The study was located at Zayed University, Dubai which specialises in the education of Emirate women. Classrooms were used and questionnaires completed after lessons between 1300–1400h. Ethical approval was granted by the "ZU Committee on the Use of Human Subjects in Research" on 9th February, 2010, #ZU09–129.

Subjects: A group of 146 students studying Physiology as a compulsory cohort of their honours degree at Zayed University were asked to voluntarily complete a structured questionnaire indicating their age, weight, average income, marital status and education. The subjects were recruited from classes and asked to remain behind during the lunch hour and participate in the study. They were educated on the importance and usefulness of research and the communication of results via publication. The

students were informed that the published results of the study would be made available for future studies and cohorts. Indeed the students were impressed that participation in the study was an important pedagogical tool to assist the teaching and learning process of the faculty. All participants lived in Dubai. Students were asked for consent before taking part in this study. Students enrolled on courses with a Physiology component included those studying B.Sc. Nutritional Sciences, B.Sc. Environmental Health and B.Sc. Public Health. Many of the students participating entered university study directly from secondary school. All the participants resided with their immediate families (father and mother) or with their husbands.

Students were asked to record the different types of foods consumed in one week within five categories: bread, cereal and starch; fruit; vegetables; meat; and milk, eggs and dairy. Numbers of responses missed or incorrect were recorded (specification, duration, none and food type).

Food categorisation and frequency of intake: Participants were asked to provide a description of food eaten, and when and how often based on a categorisation listed by Merchant *et al.*⁷ Questions relating to alcohol intake were omitted due to the religious and cultural nature of the students taking part in the study. Open-ended questions were used to determine the student's consumption of a named food from which the number of students per weekly frequency was recorded. We did not determine the quantity of food eaten because of privacy needs in private homes which would have resulted in biased or inappropriate determinations of quantity of food consumed and its relationship to satiety. The number of student responses was tabulated only for those weeks were adequate response was available: 1–5, 7, 14 and 21 of which six or more were acceptable. Where a range of times a particular stated food item was consumed per week was given, we chose the upper value.

Pilot testing of questionnaire: The questionnaire was tested on 50 students

studying Physiology at Zayed University. The results were satisfactory and pedagogically relevant and this did not necessitate any changes to the structure of the questionnaire.

Statistics: The weekly consumption of each food category (starch, fruit, vegetables, meat and dairy) was completed and recorded. Spearman's rank correlation coefficient test (Minitab 15, Minitab Inc., Philadelphia, USA) was used to determine differences between weeks of particular discussed food items. Averages of values are given as mean SD $p < 0.05$ was taken as significant.

RESULTS

All respondents were direct products of secondary school graduation in Dubai. Response rate was high. The mean age of participants was 19.3 ± 1.2 yr. (range: 18–23 yr.); body weight 56.67 ± 13.31 kg (range: 40–89 kg); and marital status (married, 3; single, 43). Only ten students indicated they worked but did not their specify income at the time; two earned 1,250 AED.

Consumption of food types seven times a week predominated (Tables 1–5). Amongst the principal foods consumed were: bread, cereal & starch (Table 1): white bread, cornflakes and rice; fruit (Table 2): apple, banana and orange; vegetables (Table 3): cucumber, tomato and lettuce; meat (Table 4): fish, chicken and beef; and milk, eggs & dairy (Table 5): milk, cheese and yoghurt. All these food items differed significantly from other weeks ($p < 0.05$).

Table 6 shows foods not eaten, type of food not specified, duration of food consumption not specified, or no response to questionnaire item.

Erroneous associations were given for vegetables where potato (n=5) and rice (n=1) were noted. These responses were omitted from the counts.

DISCUSSION

The advantage of the open-ended questionnaire used in our study was that it reduced bias as would occur if a choice of foods was given for the respondent to tick-box, and allowed more scope for detailed answers. Food consumption amongst the cohort of university

Table 1: Weekly Consumption of Bread and Cereal

Question Category	Food	Number of Times / Week								
		1	2	3	4	5	7	14	21	
Bread	Brown bread		3		1	1	3	1		
	Bread						5		1	
	White bread		2	3	2	2	14	5		
	Wholemeal bread			3						
	Arabic bread			3						
	Wholegrain bread						2			
	Nutty bread						1			
	French bread						1			
	Lebanese bread						2			
	Cereal	Wheat						1		
Chocolate cereal							1			
Cornflakes		1	1	1	1		6			
Starch	Potato	1		1	1		4	1		
	Rice						6			
	Pasta	1	1	1			1			
	Popcorn						1			
	Macaroni				1		1			

[Arabic bread is; Khobiz; Lebanese bread is flat/thin type Arabic bread] Responses: no specification, 2; no duration, 1; no response, 1.

Table 2: Weekly Consumption of Fruits by UAE Students

Food	Numbers / Week								
	1	2	3	4	5	7	14	21	
Apple	1	1	4	1		7		1	
Banana	4		3	1		6			
Orange	1	1	3	1		7			
Citrus fruits								1	
Mango	1		1			5		1	
Other fruits								1	
Strawberry	1	1	2	1		5			
Kiwi								3	
Pineapple					1	2			
Pear			2						
Fruit juice		1				2			
Watermelon	1					5	1		
Grapes			2	1		3			
Blueberries								1	

Responses: no specification, 12; no duration, 2; no response, 1.

Table 3: Frequency of Consumption of Vegetables

Food	Numbers / Week								
	1	2	3	4	5	7	14	21	
Cucumber	1	2			1	8	1		
Tomato	2	1			1	7	3		
Lettuce	1	2	2		1	12	3		
Mixed vegetables	1								
Broccoli							3		
Leafy greens						1			
Carrots	2	1				3	2		
Zuccim								1	
Carrot juice	1								
Vegetable soup							1		
Onions							1		
Mushroom	1								
Lemon	1					1			
Cabbage							1		
Pea							1		
Bean							1		
Capsicum							1		
Corn			1						

[Capsicum is green peppers]. Responses: no specification, 11; no duration, 2; no response, 4; potato chosen, 5; rice chosen, 1.

students was possibly influenced by family and individual preferences with the vast majority of items eaten being of western origin, except for the Arabic and Lebanese breads, and the goat and camel meat, which were regarded as more

Table 4: Weekly Consumption of Meat

Food	Numbers / Week									
	1	2	3	4	5	7	14	21		
Fish	1	4						12		
Goat		1	2					2		
Chicken		3		4			16	2		
Beef		3	5					9		
Seafood		1						2		
Mutton								1		
Camel		1						1		
Lamb		1								

Responses: no specification, 9; none, 2; no response, 1.

Table 5: Weekly Frequency of Consumption of Milk, Eggs and Dairy Products

Food	Numbers / Week									
	1	2	3	4	5	7	14	21		
Milk										
Milk		3	1	2	2	19			3	
Low fat milk				1	4					
Eggs										
Eggs		1	1							
Dairy										
Cheese		2	1	2		9	2	2		
Yoghurt			3			8	1	1		
Chocolate		1				1				
Cream						1				

Responses: no specification, 5; no duration, 1.

traditional and regionally available. It was apparent that affluence in families meant that students were not wanting and in general their diet was well-balanced. Despite the continental and multicultural evolution of society in Dubai, the core values and traditions remain at the heart of society. Shopping is traditionally carried out by women. Women therefore

make food choices and either prepare the family meals first hand or are supervising the preparation of the meals. In the absence of choice-price-purchase-income studies, however, this can only be a supposition. The vast majority of students completed the questionnaire satisfactory the errors recorded were most likely connected with confusion of association and understanding the English grammar in the questions.

Western diets promote, among females, the consumption of comfort foods that were more snack-related (such as chocolate and ice cream)⁸ as indicated somewhat in the current study, especially popcorn, chocolate, cereal, and yoghurt. The incidence of chocolate consumption, however, was low.

The importance of carbohydrate in the diet of these women was shown by the broad range of bread consumption with white bread predominating. The low consumption of the fancier bread types (whole meal, whole grain, nutty and French) may simply be due to price choice. Cornflakes would invariably be consumed with milk contributing partly to the latter's predominance. Pasta and macaroni were not commonly consumed, a difference from the western diet where macaroni/pasta is commonly served with mince meat. In our study there was no choice of minced meat. In UAE wheat is imported and bread is manufactured locally; it forms an important and affordable commodity in supermarkets such as Hyperpanda shelves in Dubai. Bread is an essential item at every meal time and ranges from khobiz (pitta bread) to more traditional varieties such as Regagg and Chobab. Rice is imported from India, Pakistan and China and

also forms an important staple meal in Dubai.

High intake of fruit and vegetables significantly reduces the risk of colon cancer, possibly through the protective action of quercetin.⁹ Additionally high consumption of fruit and vegetables is associated with reduced risk of ischaemic heart disease¹⁰ and during a high-vegetable diet, quercetin levels rise significantly.¹¹ In our study there was fruit consumption albeit principally limited to apple, banana and orange, closely followed by mango, strawberry and watermelon. Fruit consumption was regarded as important by respondents and may also be associated with taste and satiety in a hot, dry environment. The importance of vitamin C consumption may have also been an important factor and clearly there was no aversion to the like. The majority of vegetables eaten included cucumber, tomato and lettuce, presumably forming part of a salad or included in a sandwich, which we suggest as inadequate nutritionally if consumed alone. There was only one student who consumed leafy green vegetables posing a potential lowering of micro-nutrients and vitamins. Cucumbers contain 96% water by weight and contain no cholesterol. Tomatoes are an excellent source of vitamins A and C, whilst lettuce is an excellent source of potassium and manganese and a very good source of iron, calcium, magnesium and phosphorous. It also contains traces of sodium, copper and zinc. Cabbage is an excellent source of manganese, calcium and potassium. It is a very good source of iron, phosphorous, magnesium. It is also a very good source of fibre, folate and omega-3 fatty acids. Further, sodium, zinc and copper are found in good amounts in cabbage. Spinach contains excellent levels of manganese. It also contains very good amounts of magnesium, potassium, iron, and calcium. Copper, phosphorous, and zinc are all found in good amounts in spinach. In addition, traces of selenium are also found. The low rate on consumption of leafy vegetables such as spinach and lettuce portends that the new generation is fast sinking into the attraction of fast foods and the lack of leafy vegetables that accompanies that.¹²

Table 6: Responses without Specification or Duration

Food Group	Not Eaten	No Duration Specified	Type Unspecified	No Response
Fruits	1	2	12	–
Vegetables	4	2	11	–
Meats	2	–	9	1
Bread, Cereal and Starch	–	2	4	1
Milk, Eggs, Dairy	–	1	5	–

Probably due to taste and weight-watching, most of the respondents indicated that they ate lean meats like fish and chicken (devoid of skin). Beef and fish consumption were stated by the same number of students¹⁷ suggesting variety of choice and preference in family meals and simply indicate preference thereof. The more expensive meats (ca. US\$4.00 more expensive vs. chicken, beef and fish) (goat, seafood, mutton, camel and lamb) were less commonly eaten, although goat may be consumed based on tradition. Based on follow-up student discussions, consumption of fish was a must as it was considered a constituent of many traditional recipes (e.g. roz wa simash). Consumption of beef has increased over the past few years due to interaction with various cultures in Dubai and the introduction of beef as part of these recipes. Another reason behind the consumption of red meat is the high incidence of anaemia in the UAE.¹³ The students therefore feel that they must consume beef in order to combat the effects of anaemia.

The high milk consumption may possibly be due to their higher cereal consumption or drinking of glasses of milk during meals as indicated by many respondents (75%), and was unlikely to be related to lactose intolerance.¹⁴ There were five students who consumed low-fat milk in preference to full-cream milk, which we regarded as lower than that seen in British diets where, amongst women, the former predominated.¹⁵ Yoghurt would form part of desert after dinner and evening meals. Cheese consumption was associated with sandwiches and inclusion in salads. Eggs, chocolate and cream were not consumed in vast quantities suggesting a view of weight-consciousness amongst young women in the UAE. Although the data might point to a cultural difference when it comes to consumption of chocolates and cream, this is not the case as a study carried out in Riyadh, Saudi Arabia showed that consumption of such items

was high amongst girls.¹⁶ The differences observed in this study may therefore indicate better health awareness amongst the female population in the UAE in comparison to their counterparts in Saudi Arabia.

Further studies should measure the exact quantity/mass of foods consumed per week and the factors influencing purchasing ability and choice, both monetary and tradition. An investigation of the extent to which Western influence and food consumption has permeated the society in Dubai would be valuable. We encourage more studies, therefore, on university students studying health sciences courses in the UAE.

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Duality of Interest

No conflict of interest is reported.

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