

## ORIGINAL ARTICLE

# WEIGHT STATUS, DIETARY INTAKE AND EATING BEHAVIOUR OF NIGERIAN POSTGRADUATE STUDENTS IN UniSZA, MALAYSIA

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## ABSTRACT

*University years are a critical period regarding a change in eating behaviour, notably among international students. Body weight and eating behaviour of Nigerian students have never been investigated. Therefore, the aim of this study is to assess the nutritional status and eating behaviour of Nigerian postgraduate students in UniSZA, Malaysia. A total of 82 students (76 male and six females) with a mean age of 28.1 ± 2.0 years old participated in this study. Participants completed a set of a self-administered questionnaire and three days 24-hour dietary record. Weight and height were measured and BMI was calculated to determine the weight status Energy and nutrient intake was described in relation to the Dietary Reference Intake (DRI). Majority of the students had normal weight (69.5%), with minority overweight and obese (11.0%). The mean total caloric intake of the students was 2142 ± 434kcal/day. More than half of the students ate carbohydrate less than the recommended range while ate fat above the recommended range. However, more than half of the students consumed protein within the recommended range. Majority of the students skipped at least one meal daily with breakfast was the most frequently skipped meal (51.2%). Most students consume fruits frequently (37.8%) and 39% consume vegetables sometimes. It is about 40.2% of students never/less than once a month consumes fast food. Present study suggests that the need of further study to monitor any changes in body weight, eating behaviours of the students after living few months in Malaysia. These might help to provide a better understanding of adaptation to new culture.*

**Keywords:** weight gain; university students; International student; eating behaviour; acculturation

## INTRODUCTION

One of the major public health concerns among young adults who experienced transition into university life is poor eating habits (Nelson et al., 2008). Eating behaviour has been a major concern among university students as a determinant of health status. The transition to university is a critical period for weight gain among young adults (Wengreen & Moncur, 2009). Also, university students are found to be susceptible to weight gain in their first year of inhabitancy at the University (Serlachius, Hamer, & Wardle, 2007). Several studies have shown that university students tend to have poor eating habits, and this is related to nutritional status. There are many factors pose a barrier to adoption of healthy eating behaviors among university students such as lack of time (Silliman, Rodas-fortier, & Neyman, 2004), peer influence or lack of knowledge (Anwar et al., 2011), sedentary lifestyle, lack of availability of familiar food, and limited finance (Rodriguez & Judith, 2014) and stress (Cvetovac & Hamar, 2012). A poor eating habit is also noticeable among international students. When students leave home for studies, their nutritional and physical activity becomes their exclusive responsibility (Zarei et al., 2013), and such change would also occur in their eating behaviours. A study conducted by Papadaki et al., (2007) found that

university students living away from home in Greece were found to eat fewer fruits and vegetables, and increased their fast food and alcohol intake (Papadaki et al., 2007). Another study conducted among Asian students studying in the United States showed there were changes in the diets, decreased a number of meals, increased amount of sweet and salty snack foods and decreased vegetable intake (Pan & Dixon, 1999).

In Malaysia, the number of foreign students is increasing dramatically since 2003 (Zarei et al., 2013). However, nutritional status of the foreign student and their eating behaviours, especially among Nigerian students studying at a higher educational level such as UniSZA has never been investigated. A study carried out by Zareiet al., (2013) among the Middle East postgraduate students in UPM, reported that the nutritional status of the students was poor (Zarei et al., 2013). The previous study also shows that the dietary habit of the international student was significantly deteriorated during their first year of study (Hovhannisyan, 2007). Therefore, the aim of this study was to assess the weight status, dietary intake and eating behaviour of Nigerian postgraduate students in UniSZA, a public university in Malaysia.

## METHODOLOGY

### *Participants and ethical consideration*

A cross-sectional study was conducted at Universiti Sultan ZainalAbidin (UniSZA), in Malaysia. For the purpose of this study, all Nigerian postgraduate students were included in the study. A total of 122 Nigerian postgraduate students were registered in UniSZA. However, 14 of these students dropped out because they have transferred from UniSZA to other universities and 26 students did not return their questionnaires. Therefore, the final sample size of the students was 82 Nigerian postgraduate students. A written consent was obtained from those who agreed to participate in the study. Ethical approval for the study was granted by the Human Research Ethics Committee of Universiti Sultan ZainalAbidin [Unisza.N/1/628-1Jld 2(4)].

### *Socio-demographic and anthropometric measurements*

Socio-demographic information including; Age, gender, date of birth, marital status, the source of income, living arrangement, the field of study and place of living were self-reported. Body weight was measured using a Seca Digital Scale (813, Hamburg, Germany) to the nearest 0.1kg. Participants were asked to remove their shoes and step on the scale. Height was measured using Secastadiometer (217, Hamburg, Germany), the participants stood straight with their back facing the body meter, and the measuring beam is pulled down to rest on the head, and it was recorded to the nearest 0.1cm. BMI was calculated, and was used to categorize the weight status of the participants as underweight (BMI less than 18.5kg/m<sup>2</sup>), normal (BMI =18.5 to 24.99kg/m<sup>2</sup>), overweight (BMI 25 to 29.99kg/m<sup>2</sup>) and obese (BMI greater or equals to 30kg/m<sup>2</sup>), according to World Health Organization (2014)(WHO, 2014).

### *Dietary assessment*

Dietary intake of each respondent was assessed through 3-days 24-hour dietary record, which was self-reported by the subjects. The subjects were asked to indicate all foods and beverages they ate and drank for three days (two weekdays and one weekend), as well as the types, method of preparation, brand name, and amount eaten. Types and quantity of foods consumed were entered into Nutritionist Pro Inc. software (Axxya System), to analyze the energy and selected nutrient of the food. The average daily intake of protein, carbohydrate and fat was compared

with the ranges of population nutrient intake goals (WHO, 2003) while average daily intake of total calories, sodium, potassium, vitamin A, vitamin C, calcium, iron, thiamine, riboflavin, and niacin, was presented as mean, standard deviations, and was then compared with Dietary Reference Intake (DRI)(Ottens, Hellwig, & Linda, 2006).

### *Eating Behaviours Questionnaire*

Eating Behaviour Questionnaire (EBQ) was used to determine the eating behaviour of the subjects. EBQ is a nine-item scale that assesses the frequency of meal consumption, the frequency of snacking between meals, types of snacks consumed, and frequency of eating outside the home and take away foods, use of dietary supplements, dietary practice and participation in weight management programs (Chin & Mohd Nasir, 2009). It was scaled 1 to 6 (1= every day, 2= 4 to 6 days a week, 3= 2 to 3 days a week, 4= once in a week, 5= 1 to 3 times a month, and 6= never or less than once a month).

### *Data Analysis*

Statistical analysis was conducted using a statistical program for science (IBM SPSS, Version 20.0). Descriptive statistics were carried out, and the results are presented as frequencies and percentages for categorical variables and as means and standard deviations, minimum and maximum for continuous variables. Significant level was set at  $p < 0.005$ .

## RESULTS

### *Socio-demographic characteristics of the students*

Table 1 presents the socio-demographic characteristics of the students in the present study. Of 82 students, 76 are male and six are females, with a mean age of  $28.1 \pm 2.0$  years old. More than half of the students were single and 26.8% were married. In this sample, 91.5% of the students reside in the campus, while 85.4% of them lived with their roommates while 6.1% lived alone. Only 8.5% of the students reside off campus with their family. The majority of the students were from science based courses (58.5%), while others were from art and social science. The mean amount spent on food was RM15.6 (816.90 Nigerian Naira) per day.

**Table 1:** Socio-demographic information of the participants.

Characteristic	n (%)	Mean ( $\pm$ SD)	Range
Age		28.1 $\pm$ 2.0	24 - 32
Gender			
Male	76 (92.7)		
Female	6 (7.3)		
Marital status			
Single	60 (73.2)		
Married	22 (26.8)		
Place of living			
On campus	75 (91.5)		
Off campus	7 (8.5)		
Field of study			
Science	47 (58.5)		
Art	20 (23.2)		
Social Science	15 (18.3)		
Amount spent for food (RM) / day		15.6 $\pm$ 4.4	10 - 25

**Anthropometric measurements**

The anthropometric measures and BMI classifications of the students are presented in Table 2. The mean body weight and height of the students were 62.4  $\pm$  11.6 kg and 171.8  $\pm$  6.8 cm,

respectively. The mean body mass index (BMI) was found to be within normal range (21.2  $\pm$  3.7 kg/m<sup>2</sup>). In the present study, the majority of the students had normal weight (69.5%), with minority overweight and obese (11.0%).

**Table 2:** Anthropometric measures and BMI classifications of the students, (n = 82)

Variable/Measurement	n (%)	Mean $\pm$ SD	Range
Weight (kg)		62.5 $\pm$ 11.6	44.5 - 104.7
Height (cm)		171.8 $\pm$ 6.8	151.0 - 189.0
BMI (kg/m <sup>2</sup> )		21.2 $\pm$ 3.7	15.9 - 39.2
<u>BMI Classification (WHO BMI, 2014)</u>			
Underweight (<18.5 kg/m <sup>2</sup> )	16 (19.5)		
Normal weight (18.5-24.9 kg/m <sup>2</sup> )	57 (69.5)		
Overweight/obese (>25 kg/m <sup>2</sup> )	9 (11.0)		

**Dietary intake of students**

The mean total caloric intake of the students was 2142  $\pm$  434 kcal/day (Table 3). The present study showed that the intake of carbohydrate by the majority of the students (59.8%) was less than the recommended range of 55-75% of the total energy intake from carbohydrate. In contrast, the intake of fat by the majority of the students (69.5%) was above the recommended

range of 15-30% of total energy from fat. More than half of the students consumed protein within the recommended range of 10-15% of total energy from protein. More than half of the students have a much lower intake of calcium (98.8%), vitamin C (69.5%) and vitamin A (57.3%) below the RDA. Intakes of sodium among 82.9% of the students exceeded the tolerable upper intake (Table 3). The mean ratio of Energy Intake

per Basal Metabolic Rate (EI/BMR) is  $1.4 \pm 0.3$ . Only 25.6% of the respondents were found to underreport their energy intake while 4.9% were

over reporting. This indicates that the dietary intake data collected among the subject were in good quality.

**Table 3: Dietary intakes of nutrients of the students (n = 82)**

Variable/Measurement	n (%)	Mean $\pm$ SD	Range	Goal of nutrient intake (% of total energy)
Total energy (Kcal/d)		2142 $\pm$ 434	1121 - 2936	
Protein (mg/d)		79.5 $\pm$ 20.7	30.6 - 159.8	
Carbohydrate (mg/d)		285.2 $\pm$ 62.9	150.9 - 422.8	
Fat (mg/d)		77.3 $\pm$ 18.1	41.6 - 116.5	
% of energy from carbohydrate				55-75%
<55	49 (59.8)			
55 - 75	33 (40.2)			
% of energy from protein				10-15%
10 -15	59 (72.0)			
>15	23 (28.0)			
% of energy from fat				15-30%
15 -30	25 (30.5)			
>30	57 (69.5)			
Sodium (mg/d)		3188.5 $\pm$ 875.8	969.2 - 4591.7	
< adequate intake	4 (4.9)			
$\geq$ adequate intake	10 (12.2)			
> upper intake	68 (82.9)			
Potassium (mg)		1769.5 $\pm$ 647.6	809.8 - 5630.2	
Vitamin A ( $\mu$ g/d)		851.7 $\pm$ 444.5	8.3 - 1758.7	
< RDA	47 (57.3)			
$\geq$ RDA	35 (42.7)			
Vitamin C (mg/d)		76.4 $\pm$ 65.8	4.9 - 329.6	
< RDA	57(69.5)			
$\geq$ RDA	25(30.5)			
Calcium (mg/d)		540 $\pm$ 330.6		
< RDA	81 (98.8)			
> Upper Intake	1 (1.2)			
Thiamine (mg/d)		1.5 $\pm$ 0.6		
Riboflavin (mg/d)		1.7 $\pm$ 0.6		

*N/D= Non determine*

*RDA= Recommended dietary allowance*

Eating behaviour of the students  
Meal and snack consumption  
About 51.2% of the students consumed breakfast, 57.3% consumed lunch and 76.8% consumed dinner

daily (Table 4). Daily consumption of snack during morning tea was higher in the morning while 42.7% of the students did not take a snack during afternoon tea or supper time.

**Table 4: Meal and snack consumption of the students (n= 82).**

<b>Variable/Measurement</b>	<b>n (%)</b>
<b>Consumption of breakfast</b>	
Every day	42 (51.2)
4-6days a week	21 (25.6)
2-3days a week	9 (11.0)
Once a week	6 (7.3)
1-3 times a month	1 (1.2)
Never/less than once a month	3 (3.7)
<b>Morning tea</b>	
Every day	29 (35.4))
4-6days a week	27 (32.9))
2-3days a week	12 (14.6)
Once a week	9 (11.0)
1-3times a month	1 (1.2)
Never/less than once a month	4 (4.9)
<b>Lunch consumption</b>	
Every day	47 (57.3)
4-6days a week	20 (24.4)
2-3days a week	9 (11.0)
Once a week	3 (3.7)
1-3 times a month	3 (3.7)
Never/less than once a month	0
<b>Afternoon tea</b>	
Every day	12 (14.6)
4-6days a week	6 (7.3)
2-3days a week	9 (11.0)
Once a week	11 (13.4)
1-3 times a month	9 (11.0)
Never/less than once a month	35 (42.7)
<b>Consumption of dinner</b>	
Every day	63 (76.8)
4-6days a week	9 (11.0)
2-3days a week	4 (4.9)
Once a week	0
1-3 times a month	2 (2.4)
Never/less once a month	4 (4.9)
<b>Consume supper</b>	
Every day	10 (12.2)
4-6days a week	6 (7.3)
2-3days a week	13 (15.9)
Once a week	8 (9.8)
1-3 times a month	10 (12.2)
Never/less than once a month	35 (42.7)

The present study found that tea and bread, French fries and eggs, rice and noodles were the most frequently consumed food for breakfast among the students (Table 5). Furthermore, rice-based dishes (either rice with fried fish, fried chicken or beef) were the most frequently consumed foods for lunch and dinner. This includes rice with stewed chicken, beef or fish, fried rice and *jollof* rice. Fruits, meat pie and cake were the most frequently consumed snacks.

**Table 5: Most frequently consumed foods of the students**

Meal time	Foods
Breakfast	Tea
	Tea & bread
	French fries & egg
	Rice
Lunch	Noodles
	Rice based dishes
	Noodles
	French Fries and Chicken
	Vegetable Salad
Dinner	Beans and chicken
	Rice based dishes
	Noodles and chicken
	Macaroni
	Vegetable Salad
Snacks	French fries with chicken
	Fruits
	Meat pie
	Cake
	Soft drinks
	Milk
Sandwich/Burger/Biscuits/Ice-cream	

Majority of the students skipped at least one meal daily. Only 9.8% of the students never skipped any of the meals (Table 6). The most frequently skipped meal was breakfast (51.2%), and dinner was the least (9.8%). Most of the reasons for the meal skipping were due to sleep pattern. A number of the students (39%) replaced their meal with snacks. However, 61% did not take snacks when they skipped meals. Almost all the students (92.7%) never cooked their own meal while in Malaysia.

**Table 6: Meal skipping of the students (n = 82)**

Measurement	n (%)
<b>Meal skipping</b>	
Always	3 (3.7)
Frequently	13 (15.9)
Sometimes	58 (70.7)
Never	8 (9.8)
<b>Most frequent skipped meal</b>	
Breakfast	42 (51.2)
Lunch	32 (39.0)
Dinner	8 (9.8)
<b>Reasons for skipping meal</b>	
Time management	19 (23.2)
School/reading	15 (18.3)
Sleeping	38 (46.3)
To reduced weight/others	10 (12.2)
<b>When you skipped meal, do you take snacks</b>	
Yes	32 (39.0)
No	50 (61.0)
<b>Cooking in Malaysia</b>	
Yes	6 (7.3)
No	76 (92.7)

***Eating away from home and eating companion***

Although 28% of the students reported eating at hawker’s centres, coffee shops or other food stalls every day, about 18.3% of the students expressed that they never ate outside their home/hostel (Table 7). Regarding eating at Western fast food restaurants, 40.2% reported that they never ate at Western fast food restaurants, might be due to high cost of the food or lack of transport to go to the desired restaurants. As for eating companion, majority of the students prefer to take their meal with friends (45.1%), and 12.2% have their meals with the family. Daily intake of fruits, vegetables and soft drinks was presented in Table 7. For vegetable consumption, only 28% of the students consumed vegetables every day. Majority of the students (37.8%) reported consumption of fruits frequently, while 47.6% took soft drinks sometimes; with 20.7% taking soft drinks always. Only 2.4% never took a soft drink.

**Table 7: Eating away from home and eating companion**

Variable/Measurement	n (%)
<b>Eat at hawker centers, coffee shops or food stalls</b>	
Every day	23 (28.0)
4-6days a week	16 (19.5)
2-3days a week	9 (11.0)
Once a week	11 (13.4)
1-3 times a month	8 (9.8)
Never/less than once a month	15 (18.3)
<b>Eat at Western fast food restaurants</b>	
Every day	4 (4.9)
4-6days a week	2 (2.4)
2-3days a week	12 (14.6)
Once a week	10 (12.2)
1-3 times a month	21 (25.6)
Never/less than once a month	33 (40.2)
<b>Frequency of buying take-away food from Western fast food restaurants</b>	
Every day	6 (7.3)
4-6days a week	4 (4.9)
2-3days a week	7 (8.5)
Once a week	15 (18.3)
1-3 times a month	17 (20.7)
Never/less than once a month	33 (40.2)
<b>Eating companion</b>	
Family	10 (12.2)
Friends	37 (45.1)
Alone	35 (42.7)
Others	
<b>How often do you consume vegetable</b>	
Every day	23 (28.0)
Frequently	27 (32.9)
Sometimes	32 (39.0)
<b>How often do you take fruits</b>	
Every day	19 (23.2)
Frequently	31 (37.8)
Sometimes	26 (31.7)
Twice in a week	6 (7.3)
<b>How often do you take soft drinks</b>	
Always	17 (20.7)
Frequently	24 (29.3)
Sometimes	39 (47.6)
Never	2 (2.4)
<b>Do any of these factors affect your food choice</b>	
Food taste	34 (41.4)
Cost	4 (4.9)
Conv. of food preparation	8 (9.8)
Nutritional value	7 (8.5)
Taste & nutritional value	9 (11.0)
Others	20 (24.2)

**Dietary supplementations and types of dietary practice**

Most of the students (86.6%) did not consume any dietary supplement (Table 8). Regarding dietary practice, 29.3% of the students take care of their diet by reducing high fat and high sugar foods, and another 29.3% claimed that they were not choosy about foods, but normally ate foods that were available. Based on food choice, food taste was the major factor for the students in selecting their food, while the cost of the food was the least factor as only 4.9% of the participants looked at the cost in selecting food.

**Table 8: Dietary supplementations and types of dietary practice (n = 82)**

Variable/Measurement	n (%)
<b>Dietary supplement consumption</b>	
Yes	11 (13.4)
No	71 (86.6)
<b>Source of advice of dietary supplement consumption</b>	
Physician	9 (81.8)
Own decision	2 (18.2)
<b>Types of dietary practice</b>	
Reduce high fat and high sugar foods.	24 (29.3)
Reduce high fat, high sugar and red meat foods.	23 (28.0)
Reduce high fat foods.	3 (3.7)
Vegetarians.	2 (2.4)
Eat according to a specific weight loss diet menu.	3 (3.7)
No special diet menu but eats less to lose weight.	3 (3.7)
Not choosy on the types of food eaten and eat any food available.	24 (29.3)

**Weight management programs**

A number of the students participated in few programs in order to lose weight (19.5%). Majority take part in sports games; some prefer jogging and gym (Table 9). More than half of the students (80.5%) did not participate in any program to change weight.

**Table 9: Weight management programs (n= 82)**

Variable/Measurement	n (%)
<b>Weight change program participation</b>	
Yes	16 (19.5)
No	66 (80.5)
<b>Type of weight change program</b>	
Gym	2 (12.5)
Jogging	5 (31.3)
Sports	9 (56.3)
Taekwondo	0
<b>Source of advice of weight change program</b>	
Physician	5 (31.3)
Friends	3 (18.8)
Own decision	8 (50.0)

## DISCUSSION

The results of this study indicated that majority of the students had normal body weight, but the prevalence of underweight was higher than overweight or obese. A similar finding was observed among Chinese university students in a cross-sectional study of 540 students, done by Sakamaki, et al., (2005). In their study, 80.5% of the students had a normal weight and 16.6% were underweight, with the prevalence of BMI greater than 30 being very low. Yahia et al., (2008) conducted a similar study among 220 Lebanese university students and found out that 64.7% were of normal body weight. A study in Nigeria among 108 university students also showed that majority of the students (52.8%) had normal weight (Nmor, Nwaka, & Nmor, 2014). However, in contrast to our findings, the study reported a high prevalence of overweight/obesity (40.0%) compared to underweight students (9.3%).

Although breakfast is an important meal of the day, the present study showed that breakfast was the most frequently skipped meal. The students reported that most of the reasons were because of oversleeping, time management and school schedules. In a study carried out by Afolabi et al., (2013) among 140 Nigerian university students, meal skipping was common especially among male students. In this study, lack of time and lack of appetite was also the major reasons for skipping meal. More than half of Bangladeshi university students (54%) skipped breakfast due to class pressure (Bipasha and Goon, 2013). Another study by Satalic, Baric and Keser, (2007) among Croatian

university students showed that consumption of breakfast was irregular, particularly for men. Consumption of breakfast is very important as it significantly contributes to the whole diet nutrients adequacy (Rampersaud et al., 2005), while skipping breakfast leads to the deficit in caloric intake of the day (Levitsky and Pacanowski, 2013). On the other hand, majority of the students in the present study consumed dinner every day. This might be because the students were hungry as a result of skipping breakfast or lunch. It has been shown that hunger ratings and intake of lunch were found to be significantly increased after skipping breakfast (Levitsky and Pacanowski, 2013).

The result also indicated that food taste and nutritional value were the major factors for the students in selecting their foods. The nature of the food in Nigeria is more of salty taste while the one in Malaysia is more of sugary and spicy, sometimes with little or no salt. The saltiness threshold is higher among Nigerian students. Therefore, Nigerian students might find difficulty to cope with such kind of taste. Food aesthetic in terms of taste, texture, appearance and smell was often reported as one of the most powerful physicals reinforces of food choice (Stevenson et al., 2007). Findings of the present study showed that more than half of the students take care of their diet by reducing high fat, high sugar and red meat. Regular consumption of such kind of foods is attributed to the weight gain and obesity. A study in Nigeria among university students conducted by Nmor et al., (2014) reported a similar finding. The students engaged in a variety of behaviour such as avoiding frying, modifying meat to be low in fat, avoiding fat as flavouring and substituting high-fat foods with low fat to reduce their fat intake.

Majority of the students were also not practicing eating out at the fast food restaurants. Since the students just arrived in Malaysia, there might be lack of familiarity and easy to access of the new environment. A study conducted by Yardimci et al., (2012) among university students in Ankara, Turkey, found that 40.1% of the students eat at fast food restaurants rarely. In their study, majority of the factors influencing students' purchase of fast food were easy access, university life and taste. A study by Goon, Bipasha and Islam, (2014) among 426 Bangladeshi students also showed that the students were practicing eating out at fast food restaurants. In the study, 56% of the students reported eating at fast food restaurants once a week. Most of the reasons were because it is quick and convenient. Taste of the food and sociability were also among the reasons. Although it is convenient and tasty, fast food can have health



and social effect (Bipasha and Goon, 2013).

## CONCLUSION

To our knowledge, the present study is the first to describe the body weight and eating behaviour of Nigerian postgraduate students in Malaysia. In the present study, the prevalence of underweight is higher than the overweight or obese. Majority of the students in this study ate carbohydrate less than the recommended range but in contrast, the intake of fat was above the recommended range. The study showed a relatively healthier eating behaviour by the students, nevertheless, the unhealthy eating behaviour is still common, which was indicated by meal skipping, eating fried foods, soft drink consumption and skipping breakfast. The findings of this study are limited by the use of a sample student from just one university, which may not be representative of all Nigerian university students in Malaysia. It is suggested that, several research areas related to nutrition and well-being of Nigerian students in Malaysia need to be further studied, and the scope of feature studies should be broadened in many other universities, these may allow further accuracies in having a larger data sample.

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