

NUTRITION KNOWLEDGE ATTITUDE AND PRACTICES AMONG STUDENTS OF AHFAD UNIVERSITY FOR WOMEN

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ABSTRACT

A desire to eat a healthy diet may exist, but it does not translate fully to behavior modification. People are not willing to trade convenience for health or other benefits. Continuation of eating an unhealthy diet can lead to many health problems including obesity, malnutrition, cardiovascular diseases, diabetes etc. The study will help to identify areas of weakness in students' understanding of healthy eating and will also provide useful data for examining the relationship between nutrition knowledge and dietary behavior which, up until now, has been far from clear. The present study was Cross-sectional population study using a dietary questionnaire previously constructed and tested was administered during university hours. Each section was evaluated separately. The study is to assess nutrition knowledge, eating attitudes and practices among university students. Regarding research methods, Nutrition knowledge, attitudes and practices, socio-demographic factors, food frequency, weight, height, waist circumference (WC) and body mass index (BMI) were evaluated. The results revealed that 42% of the students get their nutritional knowledge from the media. (73.4%) didn't know the source of vitamin B12 and iron 55.1% of the students didn't know the food group that should be eaten the least. 52.6% didn't know which foods contain more fibers. 66.6% of students didn't know which foods contain the most calcium. The student field was significantly associated with several of these questions like food group that should be eaten the least (p-value =0.030) and knowledge of foods containing calcium (p-value =0.000). Knowledge about carbohydrates (p-value =0.001), fat (p-value 0.001), and hazards of low intake of fruits and vegetables (p-value 0.000). Results from nutritional attitude reveals that only 46.3% of students attempt to eat healthy. 65.1% find it difficult to eat healthy in university cafeterias, 50.6% find it hard to have time to plan healthy diet, while 50.6% enjoy eating unhealthy food. 30.9% of students never consume lentil, 28% never consume fish, 25.4% never consume lamb and 25.4% never consume beef. BMI results showed that only 46.6% of students are of a normal weight while 61% of students have an ideal WC. The study suggests lack of adequate nutritional knowledge among students. With respect to specific responses on nutritional knowledge, more than half the students did not know the correct answers to questions concerning fibers, calcium, vitamin B12 and fat. Media was the major source of information and not all students were aware of the health hazards of soft drinks and low intake of fruits and vegetables. The significant association between the students' study field and their nutritional knowledge magnifies the role of education. The students' attitude and practices needed improvement, emphasizing the need for further studies and a practical nutrition education programmes.

KEYWORDS : Knowledge, Attitude, Practice, Nutrition, BMI, Ahfad University For Women

There have been considerable changes in human lifestyle all over the world in the recent decades. Especially in recent years, the lifestyle has rapidly been changed. These changes appeared in diet, types of food, cooking time, etc. Nowadays processed foods are rapidly replacing organic food. Another change is the rapid increase in the number of restaurants and in people's tendency to eat fast food. Proper nutrition is one of the most important aspects of lifestyle (Amamoto and Andoyama, 2004). Epidemiological evidence shows that there is an increased incidence of diseases such as (Cardiovascular diseases, obesity, high blood pressure and cancer), which can be attributed to changes in lifestyle as well as changes in nutritional habits. Nutritional education is also one of the important aspects

that play a big role in nutritional knowledge by raising awareness and ultimately the health of the society (Stampfer et al., 2000). In order to remain healthy and physically active and enjoy a healthier life style it is necessary to obtain good nutritional knowledge and implement it. The knowledge, attitude and practice must be considered in people in order to promote society health. Given that one of the main goals of universities is to broaden knowledge of people of the society, so enhancing the nutrition attitudes, knowledge and practice of students have high importance because this subsequently will lead to more food-conscious society and more healthy people. Also because students are more likely to change positively, nutritional education to enhance their knowledge can be helpful for the community. Knowledge

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about healthy food choices and food safety can be predisposing factors for improving eating habits and adopting a healthy diet (Gates and De Lucia, 1998), although it is insufficient to motivate healthy eating. Factors influencing eating behaviors need to be better understood to develop effective nutrition interventions tailored to individuals to improve their healthy eating (Zhao et al., 2001).

Some researchers have shown that some students are not familiar with healthy food needed for their body in different conditions (O'De and Jennifer, 2004). Although the study showed that 85.6% of the students are familiar with the concept of balance of nutrients in food, but only 7% of them use it in their diet, yet 51% of the students showed a tendency towards learning a healthy diet (Robinson, et.al., 2009).

Due to the lack of knowledge in the Sudanese population especially in universities, students tend to practice wrong eating habits such as fast foods, this sort of food has no value to their nutrition what so ever but during the past years students seem to have diverted from home cooked meals to university cafeterias. As the foundation of Sudanese eating habits started in early childhood they paved the way for their current food choices. There are certain factors that leads to this, the most important one is the globalization phenomena that shows that there is a change in life style and nutritional habits not only in Sudan but worldwide. Due to the massive effect of the media that may give people mixed messages about what to eat to advertise their products,, the rapid spread of restaurant's that causes people to divert to such places rather than eating at home due to the lack of motivation and due to the fast life nowadays, fast foods became the main diet taken by the Sudanese population, particularly among students at various levels of education.

The main focus behind this study was to assess nutrition knowledge, attitude and practices among Ahfad University students.

MATERIALS AND METHODS

The study is a descriptive cross-sectional, community based study The study included 350 female participants from the UPP and from the 6 schools present at

the Ahfad University for Women in Omdorman province .Schools are medicine, pharmacy, health science, rural extension, psychology, and management. Students. Those students, who were part time, post diploma and post graduate students of the university were excluded.

The number of students in various years of degree qualifications selected for this study was determined by the use of this formula:

$$n = \frac{Z^2 \times P \times Q}{3.7 \text{ Measures}}$$

Measures used in the study were chosen according to the requirements of the aims and objectives of the study. For this study, questionnaires and anthropometric techniques were used.

RESULTS

Table (1) the age of most students was ranging from 19-21. The majority of students were Sudanese (86.6%) ,followed by Nigerians (6%), Somalians (4.6%), Indian (1.7%) and southern Sudanese (1.1%). In the present study 16% of students were married and 84% were single. There were 15.4% first year students, 15.1% second year, 16% third year, 15.7% fourth year, 16.3% fifth year, 1.7% sixth year and 19.7 % UPP. Of the 350 students 13.1% were from school of psychology, 10.3% from medicine, 10.9% from health science, 25.1 % from management, 8.6% from pharmacy, 12.3 % from rural extension and 19.7% from the UPP. The current place of residence of most students was at home (54.6%) then dorms (37.1%) and privately rented apartment (8.3%). The family income of the majority of students was more than 1500 SDG (69.7%), then between 500 and 1500 (24.6%) ,then less than 500 SDG (5.7%) Table 2 & 3.

Table 1 : Socio Demographic Factors of Students

Variable	N	%
Age		
18 and below	77	22.0
19-21	156	44.6
22-24	102	29.1
above 24	15	4.3
Ethnicity		
Sudanese	303	86.6
Nigerian	21	6.0
Somalian	16	4.6
Indian	6	1.7
South Sudanese	4	1.1
Marital status		
Married	56	16.0
Single	294	84.0
Academic level		
First year	54	15.4
Second year	53	15.1
Third year	56	16.0
Fourth year	55	15.7
Fifth year	57	16.3
Sixth year	6	1.7
UPP	69	19.7
Study field		
Psychology	46	13.1
Medicine	36	10.3
health science	38	10.9
Management	88	25.1
Pharmacy	30	8.6
rural extension	43	12.3
UPP	69	19.7
Current place of residence		
Dorm	130	37.1
privately rented apartment	29	8.3
at home	191	54.6
Permanent residence		
urban area	306	87.4
rural area	44	12.6
Family income		
less than 500 SDG	20	5.7
500-1500 SDG	86	24.6
more than 1500 SDG	244	69.7

Table 2 : Association Between Marital Status And The BMI

BMI	Cut of Point	Marital status			
		Married	%	Single	%
Under weight	<18.5	2	3.6%	52	17.7
Normal weight	18.5-24.9	22	39.3%	141	48
Overweight	25.0-29.9	20	35.7%	71	24.1
Obesity class1	30-34.9	11	19.6%	25	8.5
Obesity class 11	35-39.9	1	1.8%	5	1.7
Morbid obesity	=40	0	0	0	0
Total		56		294	350

Chi square = 14.931, df = 4, p value =0.005

Table 3 : Association Between Place of Residence And The BMI

BMI	Cut of Point	Residency					
		Dorm		Private rented		Home	
		n	%	N	%	n	%
Under weight	<18.5	20	15.4 %	2	6.9	32	16.8
Normal weight	18.5-24.9	66	50.8%	16	55.2	81	42.4
Overweight	25.0 – 29.9	27	20.8%	8	27.6	56	29.3
Obesity class1	30-34.9	15	11.5%	2	6.9	19	9.9
Obesity class 11	35-39.9	2	1.5%	1	3.4	3	1.6
Morbid obesity	=40	0	0	0	0	0	0
Total		130		29		191	350

Chi square = 6.553, df = 8, p value = 0.586

Figure 1 show, the major sources of nutritional knowledge for the studied population are media 42%, parents 24.9% , school 18.9%, friends 11.4% then internet and magazine 2.9%

Table (4) shows that 55.1% of the students didn't know the food group that should be eaten the least . 38.3% didn't know the three main components of food. 52.6 % didn't know which foods contain more fibers. 66.6 % didn't know which foods contain the most calcium. 35.1% didn't know examples of food containing protein other than meat. 38.9% didn't know which foods contain carbohydrates. 46% gave the wrong answers when asked to choose the true statement about fat. Large segment of students (73.4%) didn't know the source of vitamin B12 and iron.16.3 % of students didn't know that soft drinks has health hazards. other students (35.1%) weren't aware of the major health

Table 4 : Nutritional Knowledge Among Student

Nutritional Knowledge Questions	Incorrect		Correct	
	n	%	n	%
Knowledge of food group to be eaten the least	193	55.1	157	44.9
Knowledge of the three main components of food	134	38.3	216	61.7
Awareness of which foods have more fiber	148	52.6	166	47.4
Awareness of which foods have more calcium	233	66.6	117	33.4
Knowledge of food containing protein other than meet	123	35.1	277	64.9
Knowledge of food containing carbohydrates	136	38.9	214	61.1
True statements about fat	161	46	189	54
Knowledge of the sources of vitamin B12 and iron	257	73.4	93	26.6
Awareness of hazards related to soft drinks	57	16.3	293	83.7
Knowledge of problems related to low intake of fruits and vegetables	123	35.1	227	64.9
Knowledge of the best choice to reduce the amount of fat in diet	208	59.4	142	40.6

problems related to low intake of fruits and vegetables .59.4% answered incorrectly when asked to choose the best choice to reduce fat from the diet.

Table 5 shows, the percentage of correct answers was higher among students studying medicine (88.9%), pharmacy (86.7%) and health science (71.1%) while the percentage of incorrect answers were higher among students studying psychology (58.7%), rural extension

Table 5 : Food containing Calcium

Study field	Incorrect (% within Study Field)	Correct (% within Study Field)
Psychology	58.7%	41.3%
Medicine	11.1%	88.9%
Health science	28.9%	71.1%
Management	29.5%	70.5%
Pharmacy	13.3%	86.7%
Rural extension	53.5%	46.5%
UPP	31.9%	68.1%
Total	33.4%	66.6%

p value = 0.000

(53.5%) and students of the UPP(31.9%).

Table 6 demonstrated that the percentage of

Table 6 : Food containing Calcium

Study field	Incorrect (% within Study Field)	Correct (% within Study Field)
Psychology	54.3%	45.7%
Medicine	13.9%	86.1%
Health science	42.1%	57.9%
Management	38.6%	61.4%
Pharmacy	16.7%	83.3%
Rural extension	44.2%	55.8%
UPP	46.4%	53.6%
Total	38.9%	61.1%

p value = 0.000

correct answers was higher among students studying medicine (86.1%), pharmacy (83.3%) and management (61.4%) while the percentage of incorrect answers were higher among students studying psychology (54.3%), students of the UPP(46.4%) and rural extension (44.2%).

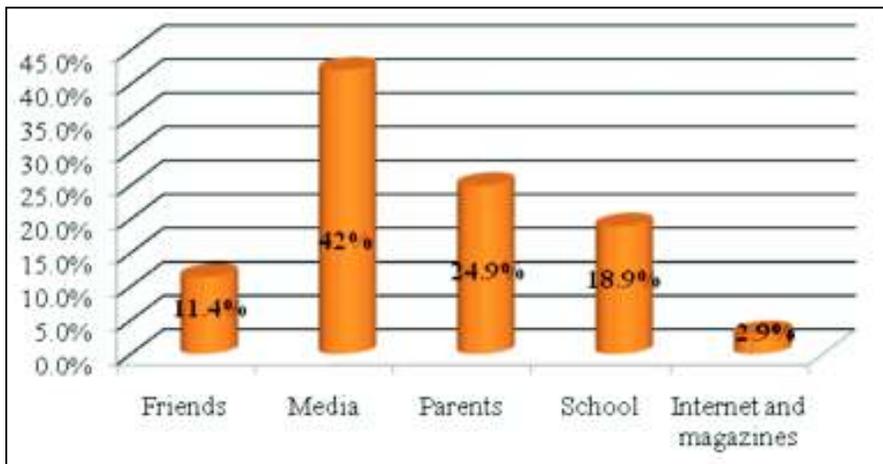


Figure 1 : Sources of Nutritional Information Among The Student

Table 7 revealed that the percentage of correct answers was higher among students studying pharmacy (80%), medicine (72.2%) and health science (57.9%). while the percentage of incorrect answers were higher among students studying psychology (67.4%), rural extension (53.5) then management (50%).

Table 7 : Knowledge About Fats

Study field	Incorrect (% within Study Field)	Incorrect (% within Study Field)
Psychology	67.4%	36.6%
Medicine	27.8%	72.2%
Health science	42.1%	57.9%
Management	50.0%	50.0%
Pharmacy	20.0%	80.0%
Rural extension	53.5%	46.5%
UPP	44.9%	55.1%
Total	46.0%	54.0%

Chi square 23.252 Df = 6 P value =0.001

Table 8 : Intake Of Fruit And Vegetables

Study field	Incorrect (% within Study Field)	Incorrect (% within Study Field)
Psychology	34.8%	65.2%
Medicine	25.0%	75.0%
Health science	34.2%	65.8%
Management	21.6%	78.4%
Pharmacy	26.7%	73.3%
Rural extension	62.8%	37.2%
UPP	44.9%	55.1%
Total	35.1%	64.9%

Chi square = 26.998 df =6 p value =0.000

Table 8 shows that the percentage of correct answers was higher among students studying management (78.4%), medicine (75%) and pharmacy (73.2%). while the percentage of incorrect answers were higher among students studying rural extension (62.8%), the UPP students (44.9%) and students studying psychology (34.8%).

National Attitude

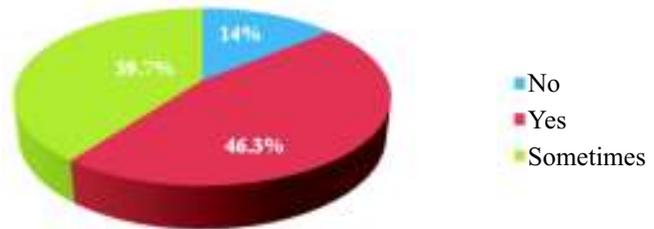


Figure 2 : Percentage Of Students Attempting To Eat A Healthy Die

Figure 2 reveals that 46.3% of students attempt to eat a healthy diet. 39.7% of students sometimes attempt to eat healthy diet while 14% of students don't attempt to eat a healthy diet.

Nutritional Practice

Figure 3 shows that 51.7% of students reported that their meal is cooked by their mothers, (40.9%) reported self-preparation of their meals .the meals of 6.6% of the study population was prepared by a maid or a cook .only 0.9% of study population reported that their meals was prepared by spouse.

Table 9 shows that the top five ranking foods consumed at high frequencies on daily basis included bread (91.4%)Milk (44.9%),fresh vegetables(38%), cheese

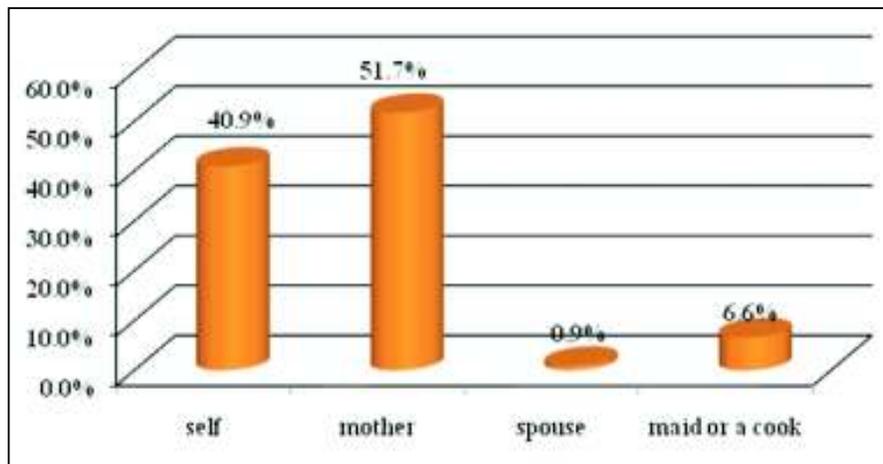


Figure 3 : Cooking Meals

Table 9 : Food Habits

Food	Daily		2-3 times/week		Once/week		Never	
	n	%	n	%	n	%	n	%
Bread	320	91.4	24	6.9	5	1.4	1	0.3
Kissra	13	3.7	66	18.9	128	36.6	143	40.9
Rice	26	7.4	170	48.6	124	35.4	30	8.6
Broad bean	26	7.4	125	35.7	135	38.6	64	18.3
Lentil	11	3.1	80	22.9	151	43.1	108	30.9
Chicken	50	14.3	185	52.9	101	28.9	14	4
Egg	62	17.7	170	48.6	92	26.3	26	7.4
Fish	22	6.3	67	19.1	162	46.3	99	28.3
Lamp	47	13.4	82	23.4	132	37.7	89	25.4
Beef	53	15.1	111	31.7	97	27.7	89	25.4
Milk	157	44.9	79	22.6	47	13.4	67	19.1
Cheese	122	34.9	159	45.4	53	15.1	16	4.6
Yoghurt	75	21.4	143	40.9	99	28.3	32	9.1
Fresh vegetable	133	38	137	39.1	64	18.3	16	4.6
Vegetable stew	56	16	153	43.7	93	26.6	48	13.7
Fresh fruits	88	25.1	138	39.4	106	30.3	18	5.1
Coffee	64	18.3	108	30.9	72	20.6	106	30.3
Tea	117	33.4	79	22.6	78	22.3	76	21.7

(34.9%) and egg (17.7%).while the top five foods indicated (30.9%),then fish (28%),lamp (25.4) and Beef (25.4%). as never consumed by the students are kissra (40.9), lentil

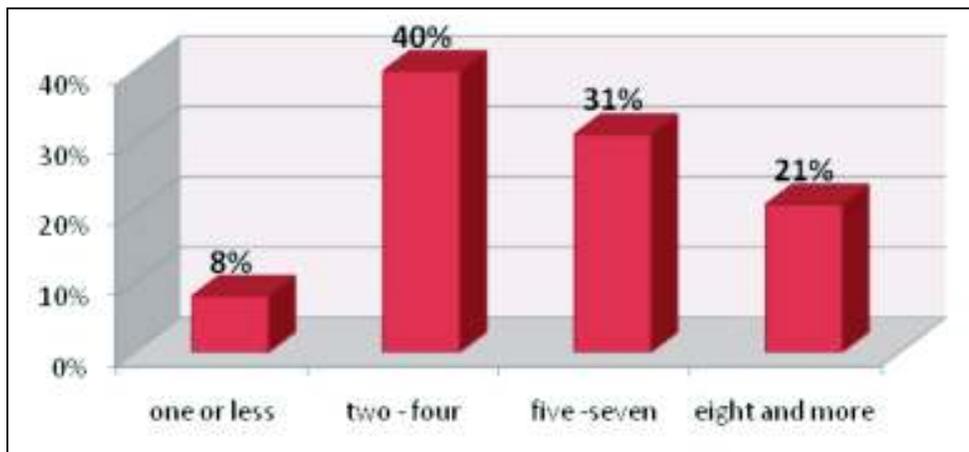


Figure 4 : Number of Water Glasses Consumed By Students Per Day

Figure 4 showed that 40% of students drink 2-4 glasses of water per day while 31% drink 5-7 glasses per day. 21% drink 8 and more .8 % of students drink one glass of water or less.

Figure 5 showed that 32.9 % of students skip dinner .31.7% skip breakfast. 19.1% skip lunch and only 16.3% of students don't skip meals.

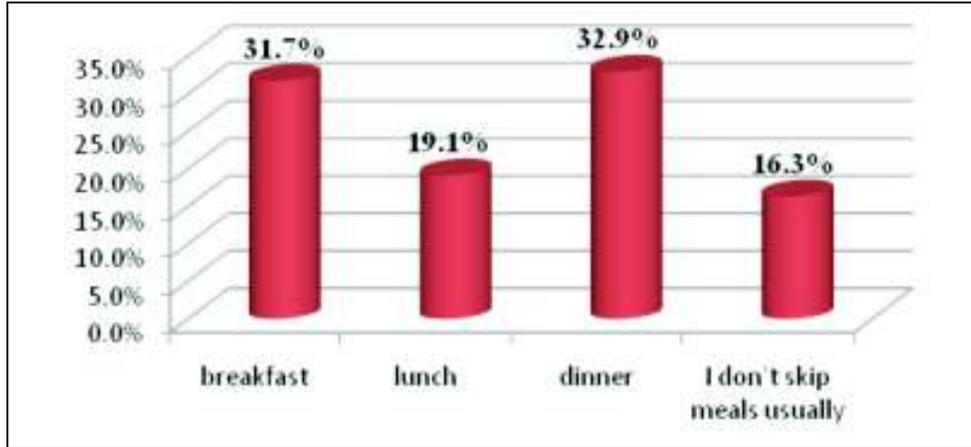


Figure 5 : Skipping Meals

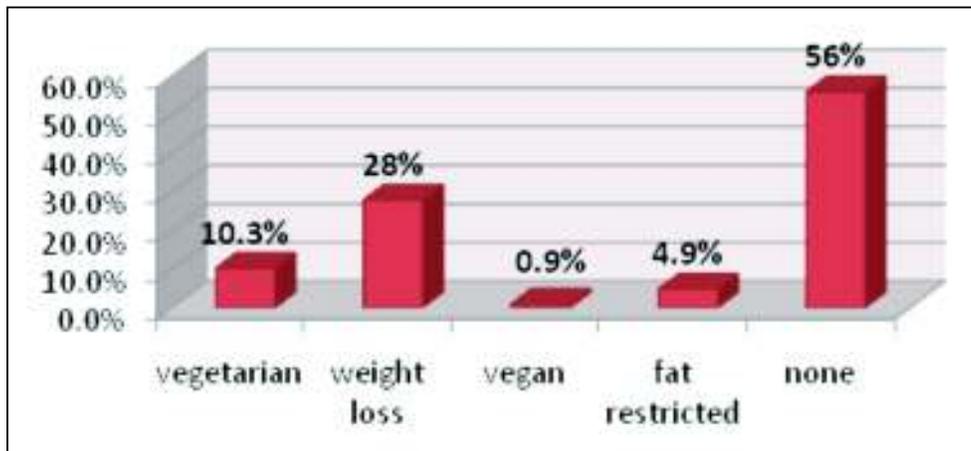


Figure 6 : Percentage of Students Following Special Diets

Figure 6, 56% stated that they are not following any special diet while 28% were on a weight loss diet. 10.3% were vegetarian, 4.9% on fat restricted diets and 0.9% were vegan

Body Mass Index

Figure 7 reveals, 46.6% of students were of normal weight. 26% were overweight. 15.4% were under weight .10.3% were obese class I and 1.7% were obese class III.

Waist Circumference

In figure 8 reveals, of the 350 students 24% were in substantial risk and 14.6% were in increased risk. while 61% were in the ideal waist circumference range.

DISCUSSION

The results on demographic data revealed that, age of most students was ranging from 19 to 24 years .The

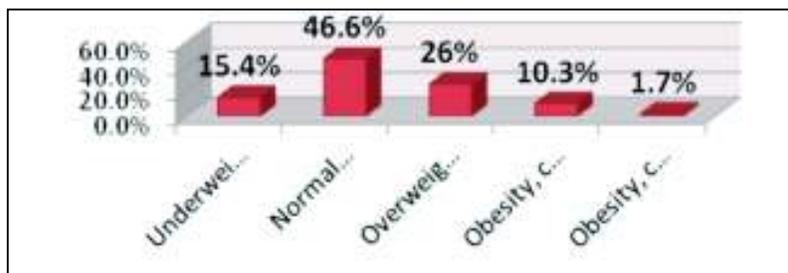


Figure 7 : Body Mass Index Among The Study Population

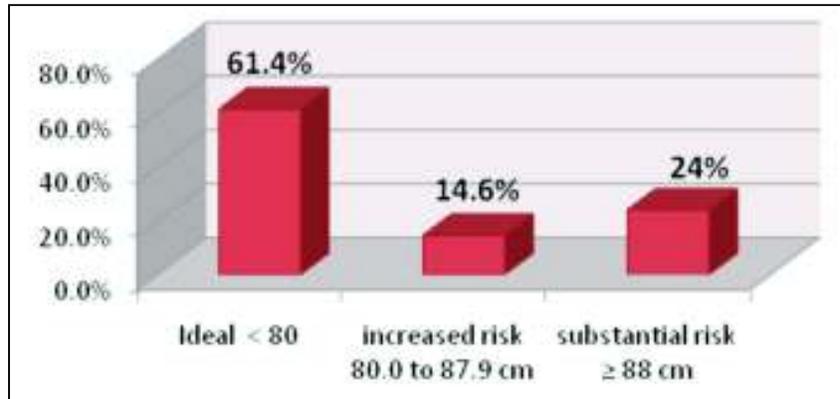


Figure 8 : Student's Waist Circumference

present study managed to shed some light on the cultural diversity present at the university although the majority of students were Sudanese (86.6%) five other different nationalities were also included in the present study: Nigerians (6%), Somalis (4.6%), Indian (1.7%) and south Sudanese (1.1%). No significant relationship was detected between the family income, (p value = 0.235), current place of resident (p value = 0.586) and BMI. This finding is inline with a study in South Africa, which revealed that no significant relationship between the BMI and place of residence exists. However a significant relationship was found between marital status and the BMI (p value = 0.005). Sudanese married women often do the kitchen work in a sitting position this lack of physical activity may play a role in accumulation of fats and lead to obesity. Moreover married women may gain more weight after marriage with the number of various pregnancies. Previous study showed that BMI increased with number of pregnancies (WHO, 2012).

The major source of nutritional knowledge was found to be media (42%). These findings agree with a South African study which revealed that, almost half of the population received their nutritional knowledge from media (46%) (Okey, 2009). These findings raise the question of whether this nutritional knowledge is accurate and emphasizes a need for another reliable source like teaching institutes.

The present study revealed that (16.3 %) of students didn't know that soft drinks have health hazards. Available evidence suggested an association between dietary behavior and individual's perception of risk

(Medicalnewstoday.com. 2009). Other students (35.1%) weren't aware of the major health problems related to low intake of fruits and vegetables. This could be because not all the students take nutritional courses as the part of their syllabus which familiarizes the students with the nutritive value of fruits and vegetables and their role in human health. This may also be due to the westernization of diet nowadays, which pushes the youth far from organic food towards fast foods which is rich in fat and carbohydrates.

It has been observed during the present research, that the student field or area (school) was significantly associated with knowledge of the food group that should be eaten the least (p -value = 0.030), knowledge of the three main components of food (p value = 0.000), knowledge of foods containing calcium (p -value = 0.000). Knowledge about carbohydrates (p -value 0.001), knowledge about fat (p -value 0.001) and knowledge about health problems related to low intake of fruits and vegetables (p -value 0.000). These findings are similar to previous studies which showed that nutrition knowledge is related to the field of study. (Barzegari et al., 2011) The increase in knowledge of students studying medicine, health science and pharmacy in comparison to students studying in the other schools in the university (REED, psychology and management) can be attributed to fact they have been subjected to nutritional courses or courses related to nutrition.

Referring to nutritional attitude, only (46.3%) of students attempt to eat a healthy diet, (39.7%) sometimes eat healthy food while 14% of students don't even attempt to eat a healthy diet. These finding correlates with the findings of an Australian study where most behavioral changes

including health related ones are influenced by an individual's readiness to change (Medicalnewstoday.com.2009). Thus the response of the students who don't attempt to eat a healthy diet (14%) shouldn't be taken lightly.

Regarding nutrition practices, in present study, many students were responsible for preparing their own meals. Cooking meals takes thought, effort and nutritional knowledge. In Sudan there are television and radio programs on nutrition and health but these programs usually deliver information in a theoretical form giving individuals the nutritional knowledge but not the way to apply it.

The top five ranking foods consumed at high frequencies on daily basis included bread (91.4%) milk (44.9%), fresh vegetables (38%), cheese (34.9%) and eggs (17.7%). It was observed that students consumed bread more than kissra, table. This result was expected because the consumption of bread among the Sudanese in general is extremely high. However their food habits do not usually distinguish between whole wheat bread and white bread in terms of consumption; therefore, they are not fully aware of the risks of the so called refined white bread. Available evidence revealed that whole wheat bread is associated with a lower risk of coronary heart diseases and it may decrease serum triglyceride concentrations (Moshfegh and Albertson, 2000). The top five foods indicated as never consumed are kissra (40.9%), lentil (30.9%), then fish (28%), lamb (25.4%) and beef (25.4%). In Sudan, fish and meat whether lamb or beef are considered as the most expensive types of food that cannot be afforded by most of the people, which may explain why it ranked in the top foods indicated as never consumed by the students. Fresh vegetables were consumed more than vegetable stew by the students. Consumption of fresh vegetables has been widely believed to promote good health; and protect human body from various diseases particularly those associated with deficiency of vitamins and minerals.

The present study also exposed that only (21%) of students drink 8 glasses of water or more. Another alarming result is that some students (8%) drink one glass of water or less per day. This lack of water consumption can lead to dehydration and affect the body's ability to carry out its normal functions.

Surprisingly the most frequently skipped meal by students (32.9%) was lunch. The present study is not in agreement with several researches reporting breakfast to be the most frequently skipped meal e.g., the majority of Japanese and Korean university students were more likely to skip breakfast. Another study among Croatian university students revealed that, breakfast was the most meal frequently skipped (Okey, 2009). The finding in the present study may be attributed to the fact that students usually have time between morning classes to eat breakfast. Only (16.3%) of students reported that they don't usually skip meals. Demonstrating that, students are unaware of the impact and important long-term consequences of skipping meals on their health.

At the time of the study (56%) stated that they are not following any special diet while (28%) were on a weight loss diet. (10.3%) students claimed to be vegetarians. (4.9%) were on fat restricted diet and few were on a vegan diet (0.9%). The increasing tendency of girls to diet recently, raises concerns about eating disorders and nutritional diseases. In the past Sudanese culture urged females to gain weight thinking that being fat equals being healthy and well cared for. It was also considered an indicator of beauty. But nowadays and with the influence of media girls are under tremendous pressure to lose weight.

The mean BMI for the total group was 23.55 kg/m². (46.6%) of the students were within the normal healthy weight, this finding is consistent with a South African study conducted on science students where (46%) of students were of normal weight. While in the current study (15.4%) were underweight while 26% of students were overweight. Approximately, (12%) of the study population were obese, the percentages of overweight and obesity reported in this study were higher than those reported in a number of universities in South Africa and elsewhere. For example, a lower prevalence of overweight (19.7%) and obesity (4.6%) for black medical students at the University of Natal, South Africa was reported (Okey, 2009).

Waist circumference can be used as a tool for identifying the need for weight management. Furthermore available evidence suggested that waist circumference

alone may be a better indicator of abdominal fat and a predictor of ill health than other anthropometric measures (Gracey, et al.,2000). Putting that in mind, of the 350 students, (24%) were in a substantial risk and (14.6%)were in increased risk. While (61%) were in the ideal waist circumference range. General lack of physical activity and the patterns of sedentary life may have contributed to the findings not to mention the effect of fast foods on students.

Study concluded lack of adequate nutritional knowledge among students. A significant association was found between the study field of students and their nutritional knowledge magnifying the role of education and teaching institutes in shaping the knowledge of young females.

The students eating practices raised serious concerns about inadequate intake of proteins by students, emphasizing the need for a practical, relevant and tailored nutrition education programmes.

The recommendation is to develop nutritional education and designing more nutritional intervention programs for the university students in general, specially focusing on the nutrients and their benefits to the body, the consequences of skipping meals, the way they prepare their food. Results from eating practices showed that a high percentage of the students have unhealthy eating practices with less than or more than recommended dietary guidelines for most food groups therefore major changes in eating habits of this sample are required.

Also the study revealed an urgent need to educate not only the students but their families as well. Due to the importance of nutrition and its impact on health the study suggests that nutrition courses should be part of the university requirements.

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