Obstetrics

Food Habits, Eating Behaviour, and Body Mass Index of Benghazi University Students

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Original Research Article

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Abstract: The university and college arenas represent the final opportunity for nutritional education for large number of students from the educator's perspective. The purpose of this study is to describe eating habits and behaviours among Public Health faculty students at Benghazi University and the association of these habits and behaviours with body mass index (BMI). A random sample of 85 students (14 male, 71 females) with mean age 21.68 years, and mean BMI was 23.3 ± 4.8 kg/m^2. Almost half of the students (50.6%) expressed having three meals per day. 72.9 % of the subjects consumed dinner 6-7 days per week. Nearly half (49.4%) of the subjects consumed two snacks per day. Weight loss efforts during last six months and doing exercise to lose weight were associated with BMI of the subjects.
Keywords: Habits, Eating, Behaviour, BMI, Weight Loss, Exercise.

INTRODUCTION

It is well known and documented that diet and nutrition play important roles in maintaining health as well as preventing non-communicable diseases that are globally increasing and pose a major public health [1]. In recent studies, non-communicable diseases such as cancer, coronary, heart diseases and obesity have been linked to unhealthy eating behaviour and inappropriate food habits which could also increase the risk of diabetes, osteoporosis, obesity and cardiovascular diseases [2, 3]. Additionally, decreased levels of physical activity and leisure are linked to the increase in the prevalence of overweight, obesity and diet related non- communicable diseases [4]. However, within a population, different factors have been shown to influence eating and health behaviour, one of which are body weight and dieting [2].

A decrease in lifestyle-associated morbidity and mortality may be achievable if satisfactory nutritional habits are adopted in early life and maintained in the long term. In fact, attitude play an important role in the adoption and maintenance of a verity of health and nutritional habits [3, 4] Knowledge about healthy food choices and food safety can be fundamental toward improving eating habits and adopting a healthy diet [5]. Though it is insufficient to motivate healthy eating alone. Factors influence eating behaviours need to be better understood to develop effective nutrition interventions tailored to individuals to improve their healthy eating [3, 5]. Colleges and universities provide numerous opportunities to positively influence physical activity, nutrition, and weight management behaviours of large numbers of older adolescents and young adults in educational settings [4, 5]. Diet, nutrients and health patterns in young adults, like university students, are implicated in the beginning of many diseases not manifested until

much later in life, for this, the relation of frequent consumption of certain foods with aspects of goods health are important in the nourishment of the human beings [5]. Although behaviours of students are considered a temporary part of college life, however, unhealthy habits picked up at this level generally persist in adult life. College life is an important stage for individuals as at this time their behaviours are conductive to change. University and college arenas, therefore, represent an important opportunity for health and nutritional education. College life is also a period during which individuals are for the most part exposed to stress and lack of time, posing a barrier to adoption of healthy practices [3]. In a survey about habits and perceived barriers to following a healthy lifestyle in a college population, the biggest deterrent to exercise and bad eating was "lack of time" (36%) [6]. Healthy dietary habits among medical students are even more important as they are future physicians and the students who personally ignore adopting healthy lifestyle are

more likely to fail to establish health promotion opportunities for their patients [3]. Also, medical students have been shown to exhibit early risk factors for chronic diseases [3, 4].

It has been estimated that only 33% of medical camps student at university of Benghazi consume good quality diet [7]. The purpose of this study was to describe eating habits and behaviours among Public Health faculty students at the University of Benghazi Medical Campus and the association of these habits and behaviours with body mass index (BMI).

METHODOLOGY

A cross sectional study was carried between October 2011 and November 2012, in order to describe the relationship between food and eating behaviours and BMI among Public Health faculty students at Benghazi University. A random sample of 85 students (14 male, 71 females) aged 19 -24 years during the academic year of 2011 – 2012. Initially 101 students were randomly approached between 1ˢᵗ December 2014 and 30ᵗʰ February 2015 (period of data collection) to participate in the study out of which 8 had to be excluded from the study on the grounds of presence of an acute or chronic illness. Of the remaining university students who were deemed fit to participate in the study, 3 refused to participate in the study and 5 students dropped out from the study or were excluded because of incomplete or implausible data. A total of 85 university students (out of the 101 possible study recruits), with complete questionnaires with clearly filled up entries were finally enrolled in the study giving a response rate of 84 %. Pilot study was carried out through out pretesting the questionnaire on ten students.

DATA COLLECTION

A detailed structured self-administered questionnaire was prepared for collecting information about the study subject, selected socio-economic characteristics, dietary information and anthropometric measurements. The questionnaire was reviewed before being translated into Arabic. The questionnaires were reviewed for missing portion or ambiguity. Incomplete or unclear questionnaires were excluded from the study. The questionnaire was divided into various sub-sections. The first section covered various characteristics like preliminary information: age, gender, nationality, marital status and part-time employment, family information like paternal and maternal education, monthly family income and its self-perceived adequacy to purchase nutritious food. Living conditions include type of housing and questions pertaining to living conditions. The next part of the questionnaire had a detailed section for obtaining academic information like study year, and study major. The sub-section for collecting information about the dietary characteristics included questions related to self-reported food intolerance and/or food allergy, eating out (frequency of eating out and food preferences while eating out) and information regarding discretionary use of table salt and current intake of nutritional supplements, fruits and vegetables consumption and information about efforts to less weight.

Measurements

Height and weight measurements used to calculate Body Mass Index (BMI) were taken in a private area using standard techniques as recommended by the World Health Organisation (WHO). Weight was measured with a SECA Platform lever scale (Germany) to the nearest 0.25 Kilogram (kg). Height or stature was measured using telescopic height rod attached to the SECA scale and recorded to the nearest 0.5 Centimetre (cm). BMI (weight in kg/height in m2) was used to define weight status. WHO cut off ranges for adults were used to define underweight (< 18.5), normal BMI (18.5-24.9), pre-obese (25 to < 30) or obese ($\geq$ 30). The underweight and the obese were further classified on the bases of the degree of underweight [mildly underweight (17< 18.5), moderately underweight (16 < 17) and severely underweight (< 16)] and obesity [obese class I (30 <35), obese class II (35 < 40) and obese class III ($\geq$ 40)] respectively [8].

Data Analysis

The data set was cleaned and edited for inconsistencies. Missing data were not statistically computed. Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS, version 21) software. Descriptive statistics such as means and standard deviations (SD) were calculated for the continuous variables and frequencies for qualitative data.

Ethics

Informed consent was obtained from the subjects who were also assured of the confidentiality of the information collected. The research was approved by the administration of University of Benghazi. Prior to the start of the project the university administration was informed about the aim of the study to obtain the maximum possible cooperation to conduct the study.

RESULTS

A random sample of 85 students (14 male, 71 females) aged 19 -24 years; with mean age 21.68 years. The average height was 164.1 ±7.421 cm; while the average weight was 63.03 ±14.855 kg. Mean BMI was 23.3 ±4.8 kg/m². 74.1% of the students were within the normal weight range, 16.5 % students were overweight. 41.2 % of students had family income more than 500 Libyan Diner (LD) as shown in Table 1. 63.5 % of students consumed breakfast outside home sometimes during the week; and a much lower for the dinner consumption (37.6%), while lunch and snacks consumptions had almost the same distribution (72.9 %

and 74.1% respectively) as shown in Table 1. With regard to the dietary pattern of students and their distribution according to BMI, Table 2 shows that almost half of students (50.6%) reported having three meals per day, 49.4 % of students consumed breakfast 1-2 times per week; (78.6 %) of which had normal weight. 25.9% of student reported eating lunch 6-7 days per week. 72.9 % reported consuming dinner 6-7 days per week. Nearly half (49.4%) of subjects consumed two snacks per day. different pattern of vegetables among students were found nonetheless majority of those consuming vegetables had normal body weight. Similarly, although there is a range of carbonated drinks among students; most of students who reported consuming carbonated drinks had normal body weight. All of these patterns observed had no statistically significant difference across weight groups except for weight loss efforts during last six months and doing exercise to lose weight, as evidenced in Table-3.

Table-1: Subjects' characteristics

Variables	Frequency	Percentage
Gender		
Male	14	83.5
Female	71	16.5
Age (Years)		
19-22	52	61.2
23-26	33	38.8
Specialization		
General	43	50.6
Nutrition	16	18.8
Environment	16	18.8
Health Administration	10	11.8
Academic Year		
Pre-medical	24	28.2
First	19	22.4
Second	21	24.7
Third	21	24.7
Income		
<200	3	3.5
200-350	21	24.7
350-500	26	30.6
>500	35	41.2
Father education		
Primary	8	9.4
Secondary	19	22.4
Graduation	19	22.4
Post- graduation	35	41.2
None	4	4.7
Mother education		
Primary	14	16.5
Secondary	16	18.8
Graduation	30	35.4
Post- graduation	15	17.6
None	10	11.8
BMI		
Under weight	1	1.2
Normal	63	74.1
Overweight	14	16.5
obese	7	8.2
Breakfast out home		
Yes	54	63.5
No	31	36.5
Lunch out home		
Yes	62	72.9
No	23	27.1
Dinner out home		
Yes	32	37.6
No	53	62.4
Snacks out home		
Yes	63	74.1

No	22	25.9

Table-2: Meal Pattern of Study Subjects According to BMI

Variables	Percentage of Subjects			
	Under weight	Normal	Overweight	Obese
Number of daily meal				
2	0	66.7	16.7	16.7
3	0	74.4	18.6	7
4	0	70	20	10
Breakfast per week				
1-2 days	2.4	78.6	7.1	11.9
3-5 days	0	75	25	0
6-7 days	0	72.4	24.1	3.4
None	0	50	33.3	16.7
Lunch per week				
1-2 days	0	78.1	15.6	6.3
3-5 days	0	69.6	13	13
6-7 days	0	77.3	18.2	4.5
None	0	62.5	25	12.5
Dinner per week				
1-2 days	0	66.7	22.2	11.1
3-5 days	0	55.6	33.3	11.1
6-7 days	0	72.9	14.5	9.9
None	0	100	0	0
Snack /Day				
None	0	0	100	0
one	0	100	0	100
Two	2.4	76.2	14.3	7.1
Three	0	100	0	0
Small frequent meal				
Yes	1.7	75.6	15.3	8.5
No	0	73.1	19.2	7.7
Vegetables Consumption				
1-2 days	0	72.4	13.8	13.8
3-5 days	3.8	76.9	11.5	7.7
6-7 days	0	76	20	4
None	0	60	40	0
Fruits Consumption				
1-2 days	0	70.4	13.8	15.8
3-5 days	1.8	77.9	11.5	8.7
6-7 days	3	73	18	6
None	0	60	40	0
Carbonated Drinks per week				
No	0	60	26.7	13.3
Once	0	79.4	11.8	8.8
Twice	7.7	84.6	7.7	0
Three times	0	91.7	8.3	0
Four times	0	44.4	44.4	11.1
Five times	0	50	0	50

Table-3: Weight Loss Attempts among Subjects According to BMI

Variables	Percentage of Subjects			
	Under weight	Normal	Overweight	Obese
Weight loss efforts last 6 months*				
No	1.8	85.5	10.9	1.8
Yes	0	53.3	26.7	20
Limiting food intake to lose weight				
No	2.1	91.5	6.4	0
Yes	0	51.6	25.8	22.6
No, but I need to limit food intake	0	57.1	42.9	0
Doing exercise to lose weight**				
No	0	93.5	6.5	0
Yes	3.4	51.7	24.1	20.7
No, but I need to do		50	40	10

*P = 0.003   ** P= 0.054

DISCUSSION

This study was carried out to determine eating habits and behaviours in university students in relation to weight status defined by BMI. Most students participated in this study had normal weight status (74.1%) with only (1.2%) overweight and (24.7%) were overweight or obese. While it is known that the sample taken in this study does not represent this age group in Libya, apparent similarities with other studies carried in Libya and other countries are interesting. In a study by Elmabsout *et al*., at Benghazi Medical University with a similar context; 73.6%t were located in normal weight range. underweight were around 5%, whereas overweight and obesity was 21.5%, [9] while in a previous study on university students carried at the same time with this study by Omar et al 2017 (62%) of the sample had normal weight status, 9 % were underweight and (29%) of the whole sample were overweight or obese [10].

Obesity and overweight are apparently higher than other European nations, in a French study carried out on university students, percentage of overweight students was 1.8%, and obese were 0.3% [11] and in a European study, overweight and obese students represented (7.9%, and 1 % respectively) of total university students [12]. Similar in Japans study, 5.8 % of university students were overweight, and 0 % were obese [13]. In United States of America (USA) where obesity is a major problem, 35% of college students are reported to be overweight or obese [14].
Libya could be joining countries that suffer from obesity epidemic [15]. However, it should be emphasised that the self-reported weight and height for some students could be limiting factor when attempting to compare with other results.

Among our study participants, nearly half of the students' meal pattern was close to traditional Libyan's three meals a day, although weight status did not differ with this meal pattern in term of statistical significant. It was observed that the majority of students who had three meals a day had normal weight status, while only 6.9 % of those who consumed three meals per day were obese. This is consistent with previously mentioned studies [10, 11].

Habits of skipping meals were also studied. Skipping of breakfast meal has been associated of lower nutritional status and a risk of cardiovascular diseases [16]. It has been also reported skipping of breakfast may contribute to obesity [17]. In our study, half of the students reported half of the breakfast one to two days a week, and skipping of breakfast on other days. This observation is consistent with results of Japanese study [18]. In contrast, a Chinese study revealed that a high proportion of Chinese students (80%) consumed breakfast regularly [19].

Patterns of lunch consumption were reported differently between students, about a quarter consumed lunch one to two days per week; while almost another third consumed lunch three to five days a week. Lunch time in Libyan culture is afternoon between 12:30 - 2:30, most students at this period are having classes or engaged in group studies; which could explained variability in this answer, though this theory needs to be tested in future research. On the other hand, dinner seems to be the meal of the majority (80%); which is consistent with French study. However, lunch and dinner did not seem to affect the weight status of the current study.

Snacks seems to be habitual in young adults as were also described by [20, 21]. Most students in our sample describe their eating pattern as having frequent small sized meals, and nearly half of the students have two snacks a day. Also, most students who reported having snacks, either 2, 3, or 4 snacks per day were normal weight. Interestingly, only obese and overweight reported having no snacks at all (50%, 50% respectively), which may be reflection of smaller number and bigger size main meals consumed by overweight and obese, and small frequent meals consumed by normal weight, however, these observational were not statistically significant. In French students, 2.8 meals and 0.7 snacks were reported on the average. The mean number of snacks in French students is less than one a day, while among the twenty European countries study, mean number of snacks was 1.64, for example, in United Kingdom (UK); it was 1.8282.7% [22, 23]. In USA, a study among students from 48 states, they reported that they had snacks four times a day [24]. A survey by the American Dietetic Association indicated that obesity, or being severely overweight, is a fast food related issue [25].

The majority of students in our study were eating breakfast and lunches outside home, most of those students have normal body weight status. Only a third of the students have dinner outside home. The students' weight status does not seem to be affected by eating outside home as shown from statistical tests, and would be interesting in future research to investigate gender differences, social, and economical aspects with regard to eating out. We assume that long study hours, and more convenience provided by fast food restaurants might have played a role in the high number of students eating out. Students often select fast food due to its palatability, availability and convenience [24].

While it is difficult to determine whether students are meeting the daily recommendation of fruits and vegetables, most students seem to be consuming vegetables 1-7 days a week, and fruits 1-5 days a week. In a previous study by [10] only (2.2%)

of Benghazi University medical students consume three fruits on a day with serving size of "1 medium fruits 52%, and 8.8% have concentrated juices daily (40% 1.25 cup". Omar et al also found that students consume less than the recommended amounts of vegetables, with (3.2%) have vegetable a twice a day, and about (2%) would have 3-4 vegetables servings a day. Among Chinese university students, 80% of students eat fruits and vegetables a twice a day, and 32.5% were eating fruits on daily basis [20]. The weight status of our sample was not affected by consumption of fruits and vegetables were the observations were tested statically.

Consumption of carbonated sugared drinks also correlates with increase adult onset of Type 2 Diabetes Miletus (Type II, DM). Consumption of carbonated drinks by adolescent and children also appears to be related to increased salt and fluid intake in this age, and having possible cardiovascular implications [17, 18]. 91% of current study students; who consume carbonated drinks three times per week had normal weight status. However, consumption of carbonated drinks had not associated significantly with students' weight status.

35 % of students in the current sample did attempt to lose weight in the last six months periods, and the majority of them had normal weight status, while 12% were obese and overweight. On the other hand, and despite the higher percentage represented by normal weight students, more obese and overweight students fell in the weight loss attempts group (46.7%). Furthermore, weight reduction attempts were statistically different when compared among normal, obese, overweight and underweight students; thus weight status was correlated with weight loss attempt in our study. Same pattern was with attempts to lose weight by limiting food intake "dieting". More obese and overweight students were in this category then those who did not dieting in order to lose weight. Weight status defined by BMI was found to correlate with limiting food intake, suggesting a relationship between the two; the higher the weight of the student, the more likely he/she will attempt to limit their food intake to lose weight.

Exercise did differ as well with weight status, more obese and overweight do play exercise to lose weight or expressed the need to do so in the near future. Despite this, frequency of playing exercise did not show any difference or relation with weight status. Although we did not study gender differences with regard to weight loss attempts, it is interesting to see that the pattern we observed in to our study is quite similar to one observed among French students where as much as 35% of female reported that they were trying to lose weight and 5.3% were dieting through limiting their food intake. [10] While it is less than Japanese students, who 700% of female said that they

were trying to lose weight, along with 63% of Japanese male [16].

Time, duration, sample size and using of self-reported questionnaire are limitations of this study.

CONCLUSION

The findings of the current study reveal that the majority of students were classified into normal BMI group, with the prevalence of obesity being low in this study sample. The meal patterns in selected students were very similar to the traditional eating pattern model. Obese and overweight students had a greater desire to be thinner and lose weight as determined by their dieting, exercise, and weight loss attempts. Habits involving regular eating patterns represent practices that ought to be encouraged, along with strategies that need aimed in increasing fruits and vegetables intake, and to encourage eating more home-made health meals.

Authors Conflict

Authors have declared that no competing interests exist.

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