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Research Article

An Assessment of Daily Plain Water, Fluid Intake Levels and Its Association with Total Energy Intake among Medical Students in Benghazi University in Libya

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Abstract: *Background:* Water is the main component of the human body. The effect of an adequate fluid consumption is well-known and its relevance for the maintenance and promotion of health cannot be denied. Water is an essential nutrient for humans with several vital roles including: maintaining body functions, temperature and preventing dehydration. The human body consists of about 60% of water. The water in the body has numerous physiological roles: it is essential for the breathing (oxygen transport to the cells) and metabolism, digestion (absorption of nutrients). Nevertheless, many students ignore drinking water because of the modern lifestyle and the existence of alternatives to water. The previous studies notes that drinking water is connected with healthy dietary practices including reduced sugar-sweetened beverages consumption, but few studies considered the impact of drinking water on the total energy (calories) intake. *Aim of study:* This study was designed for evaluate of both plain water (pure water) and total water (water from pure water, beverages, and foods), and the intake is tested for its relationship with the daily energy intake, body mass index (BMI), and physical activity of students. *Methods:* This study was designed a cross-sectional descriptive study, a total number of 455 (231 females and 224 males) of medical college students were collected randomly, aged from 19-30 years, and collected from five medical faculties for all study years in the campus, ,food, fluid, and plain water intake of subjects was assessed, by 24-hour recall method. Dietary intake of subjects was analyzed manually by nutritionists. In this study, an assessment of the intake of both plain water (pure water) and total water (water from pure water, beverages, and foods) is performed, (drinking fluid values merged with data on the water content of foods and the rate of metabolic water were figured out. The mean of total and plain water intake made and analyzed (spss version20). Statistics testing: A significance testing such as a t-test, ANOVA and chi-square test we used. The intake both plain and total water intake was compared with its recommended levels, daily calories consumed, body mass index BMI, and physical activity of students. *Results:* Results indicated that in these age groups, plain water intake was 1627 ± 1100 mL/ day and total water intake was 2600 ± 1282 mL/ day for all participants. The plain water intake for male was 2190 ± 1363, and the plain water intake for female was 1384 ± 992. Total water intake for male was 3300 ± 1627, and 2360 ± 1078 for female. Furthermore, the results indicated that the plain water composes 43% of the daily total water intake for the whole study sample. In reference to Adequate Intakes (AIs), total water intake was closer to the recommended levels compared to plain water intake. Males showed better compliance with the recommended levels of AIs than females, Females who got less than the recommended daily intake of total water was 85.7% of the total female population compared to 68% for the general male's population. About a 22.8% males were above the recommended level of total water intake, compared to only 14% for females. The results also showed that male students more consumption of tea and coffee than female. While the consumption of male and female for milk and other beverages nearly the same. Total Water intake were strongly and positively correlated with plain water intake (r=0.92, p<0.001). The statistical analysis showed no significant relationship between BMI and water

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intake in male and female were (P=0.845) (P=0 .447) respectively. In addition there is no significant relationship between physical activity and water intake in male and female were (P=0.136) (P=0.670) respectively. The study revealed the daily energy intake (Kcal) was positively correlated with total and plain water consumed (r=0.93, p<0.001), direct intermediate correlation) with total water intake (mL) with p value p=0.000. ***Conclusion:*** We excluded that, most medical students were sedentary lifestyle. Plain Water intake was less than the Adequate Intakes (AIs), and they were depended on other fluids rather than plain water, therefore intensive nutritional educational intervention programs targeting medical students to improve their beverage choices. And they should be encouraged to drink the recommended amount of plain water in addition to maintain their weight by fallowing healthy diet and exercise. Finally, more studies need be conducted using various assessment tools with larger sample sizes.

Keyword: Water**;** Drinking Patterns; Fluid Intake; Beverage Consumption Pattern; University; Student.

INTRODUCTION

Insufficient and inappropriate daily fluid intake in a long period may have adverse effect on human's health. Water is essential for life, is one of the most important substances on earth. All humans, plants and animals must have water to survive. If there was no water there would be no life on earth [1].This is important to us because we are mostly made of water, and knowing what water does for the human body, up to 60% of the human adult body is water, the brain and heart are composed of 73% water, and the lungs are about 83% water. The skin contains 64% water, muscles and kidneys are 79%, and bones are 31%. Each day humans must consume a certain amount of water to survive. Of course, this varies according to age and gender, and also by where someone lives. Generally, an adult male needs about 3 liters per day while an adult female needs about 2.2 liters per day. All of the water a person needs does not have to come from drinking liquids, as some of this water is contained in the food we eat [2]. Water is necessary for optimal cells, organs and tissues health to maintain other body functions [3]. Water has many biological functions as: a large heat capacity, which contributes to limiting changes in body temperature in a warm or cold environment. Water has a large capacity for vaporization of heat, which allows a loss of heat from the body even when ambient temperature is higher than body temperature [4]. Also, for several biological and physical processes such as: digestion, absorption, and excretion [5]. Water has many benefits, the most important of which is weight loss by enjoying good general health. Many studies have demonstrated the benefits of consuming a lot of high-quality water, such as the study published in the Journal of the American Dietetic Association (ADA) that found that, water can reduce the risks to the pyramid. The total of health problems such as breast cancer, colon cancer, obesity, urinary tract stones, etc. It has been proven that it has reduced certain risks from cancer by about (25-79%) by drinking [5-10] cups of

water every day [6]. Drinking large amounts of water is often recommended for weight control. water intake stimulates energy and fat metabolism, however, controversial with some studies reporting that drinking half a litre or more of water increases resting energy expenditure (REE) by 10–30% and decreases respiratory quotient (RQ), whereas others report no significant changes in REE or RQ [7].

Today, many students ignore drinking water because of the modern lifestyle and the existence of alternatives to water such as juices, drinks and the media to promote their products to attract the consumer [8], although everyone suffers from thirst from time to time. And it can delay the need to drink or stop drinking a quantity of water [9]. Studies in humans have shown that numerous factors affect fluid intake. Availability, flavor, flavor variety, beverage temperature, proximity of the beverage to the person, and even beverage container have all been shown to impact intake [4]. During increased physical activity and in conditions other than temperate, sweat loss contributes to body water loss [10]. The minimal amount of fluid loss that can occur is referred to as the obligatory water loss. However, a variety of factors can affect obligatory loss. For example, obligatory urine loss occurs because of the need to remove various solutes from the body [11]. The body loses water by breathing, sweating, and digestion. It's important to maintain drinking fluids and eating foods that contain water [12, 13]. The amount of water need depends on a variety of factors, including the climate that live in, how physically active, and whether experiencing an illness or have any other health problems. Water is consumed from different sources, which include drinking water (tap and bottled water), beverages, moisture content of foods, and water produced by oxidative processes in the body [14]. Humans ingest water as plain drinking water, as beverages, and in food. Water in food can be inherent or added during preparation, and also produced by metabolism. All contribute to the total water intake

[15]. Dehydration is loss water daily over period of time [16]. Because of excessive dehydration leads to poor cognitive and physical performance such as unwillingness to work, headache and dizziness [17]. People who drink small amounts of fluid are more likely to develop nephritis, Urinary tract and kidney stones [18]. Drinking liquids such as milk, light stimulants (such as tea and coffee) and soft drinks because they contain calories provide energy and not because of thirst [19]. The required water of body could be supplied with various beverages including water, milk, tea, fruit juices, coffee, and soft drinks. For example research conducted in 2015 by Guelinckx et al., about Intake of water and other three continents beverages of children and adolescents samples of 3611 children (4–9 years) and 8109 adolescents (10–17 years). The study showed that across the total samples of the countries, the highest daily intakes were observed for water (738 ± 567 mL/day), followed by milk (212 ± 209 mL/day), regular soft beverages RSB (168 ± 290 mL/day) and juices (128 ± 228 mL/day) [20]. The proportion of water that comes from beverages and food varies according to the proportion of fruits and vegetables in the diet [21].

Athletes should drink enough fluid or should be well hydrated prior to exercise. The goal of pre-exercise fluid intake is critical for decreasing the risk of dehydration (loss of body water) and its negative health consequences (e.g., heart disease), and maintaining exercise performance [22]. Study in 2018 by Alanazi, assessment of daily Plain water (pure water) intake level and its association with total energy intake, the study presented both plain water and total water (water from pure water, beverages, and foods) relationship with the daily calories consumed among college students .The plain water intake of all participants was Less than the requirements. It was found that the daily energy intake (Kcal) was positively correlated with total water intake [23]. The type of fluid consumed by individuals should also have received attention [24, 25]. In fact, young People in this age group are vulnerable to develop unhealthy behaviors [26, 27], which will predispose them to chronic diseases later in life [28]. A longitudinal study tracking soft drink intake from early adolescence to later adulthood demonstrated that soft drink consumption from young adulthood remained stable [29]. This data indicates beverage consumption habits formed during young adulthood may have a strong impact on beverage choices in later life. Insufficient and inadequate daily fluid in a prolonged period may have a negative impact on human health [30]. The first effect it is dehydration. Several factors may increase the likelihood of chronic or mild dehydration, including a poor thirst mechanism, dissatisfaction with the taste of water, common consumption of the natural diuretics caffeine, participation in exercise, and environmental conditions. Young adulthood is a unique period whereby youth obtain independence from their parents. This age group

is more susceptible for unhealthy drink choice [31, 32]. Therefore the choice type of beverages consumed by students should also have received attention [33]. The required water of body could be supplied with various beverages including water, milk, tea, fruit juices, coffee, and soft drinks. However, regarding their nutritional value and their effect on health, it is necessary to have a healthy drinking pattern during life cycle. In fact, this will predispose them to chronic diseases later in life [34]. "A longitudinal study tracking soft drink intake from early adolescence to later adulthood demonstrated that soft drink consumption from young adulthood remained stable" [35]. This data indicates beverage consumption adulthood may have a strong impact on beverage choices in later life. Due to the conflict between researchers about whether the medical students drinking an adequate amounts of water or no, this study is to explore the total and plain water intake, body weight and physical activity levels of medical college students of Benghazi University. Considering the importance of student's health as young members of society they will be able to direct the people for healthy lifestyle.

AIM OF STUDY

The present study to evaluate the amount of total and plain water intake, and source of fluids consumed by medical students. To determine whether these amounts and sources of fluid were enough and appropriate. Also to study the correlation between daily water intake, total energy intake, BMI, and, physical activity. In addition to distinguish between male and female medical students in their water consumption, and to determine the most popular drinks for medical students.

METHODOLOGY

Study design: The study applied a (cross-sectional), (descriptive study design).

Study area: Medical students who were enrolled in Benghazi University in Libya.

Study population: Randomly selected from a sampling from all department of university (medicine, dental, pharmacy, public health and medical technique) aged between (19-30) years .There is sample size of 450 students (224 male and 231 female).

Data collection method: Data were collected using a structured dietary pattern questionnaire. Information on demographic characteristic, feeding habit, and dietary practices 24h recall were obtained using self-administered questionnaires to respondents. We asked them how much water and beverage they consumed in cup within 24 hours, and we use a nutrient composition of food. And then we converted it to the volume in liters. It was coded with a unique number

representing each respondent. The questionnaire was used to collect the following information:

Socio-demographic characteristics: This comprise information on age, gender, course of study, year of study and this provided background information of students recruited into the study.

Anthropometric measurements: Anthropometric measurements of weight and height were taken with the respondents wearing light clothes and no shoes. The body mass index (BMI) was calculated (weight for height) for all sample students.

Weight measurement: To ensure reliable measurements of body weight using the mechanical bathroom scale, the scale was zeroed before the respondent stepped onto it. The respondents were asked to remove any 'heavy' items from their pockets (key's, wallets etc.) and remove any heavy items of clothing or apparel (big jackets, shoes, woolen jerseys etc.). They were asked to look straight ahead and stay still on the scales. The needle/digital screen was allowed to settle before the measurement was recorded. The body weight (kg) was measured to the nearest 0.5 kg.

Height measurement: Height measurement was taken using a "drop down" tape measure fixed at about 2 m on a wall. The respondents were asked to remove their shoes prior to taking the measurement. They were asked to stand with their back to the wall and look directly forward. The back of their feet, calves, bottom, upper back, and the back of their head should be in contact with the wall. They were positioned directly underneath the drop down measuring device. The measuring device was lowered until it rested gently on the top of the respondent's head and the measurement was recorded. Their height (m) to the nearest 0.5 cm was recorded.

DATA ANALYSIS

Data presentation: Mean standard division; frequency distribution table and column charts were used to describe and compare variables. Statistics testing: A significance testing such as a t-test, ANOVA and chi-square test were used to examine the difference mean of variables; a p-value of less than 0.05 is statistically significant. Data analysis: was executed using the statistics package social science (SPSS) program version 20.

RESULT

Demographics

A total of 455 participants of medical college students were divided to 224 samples male and 231 samples female aged from 19-30 years completed the study. According to the results the age was divided to 3 groups and weight was divided to 3 groups. The results showed the majority of students at age 23-26 year were students n 321 (70.5%), 19-22 year were students n 96 (21.1%), and 27-30 year n 38 (8.4%). The gender distribution nearly the same, were females (51%), males sample was (49%). About 68% of the sample population had normal BMI range, while 22.8% were overweight, 4.8% were obese, and only 3.7 % were underweight. When participants were asked about their physical activity, most of them reported being sedentary lifestyle 61 %, followed by being moderately 30%, and only 8.5% reported having an extreme activity (Table 1).

Table-1: General student's characteristics gender, age, body mass index, and physical activity level

Variable	N = 455	Percentage (%)
Gender		
Male	224	49 %
Female	231	51 %
Ages (years)		
19-22	96	21.1 %
23-26	321	70.5 %
27-30	38	8.4 %
BMI (Kg/m2)		
Underweight <18.5	17	3.736 %
Normal 18.5-24.9	311	68.35 %
Overweight 25-29.9	104	22.86 %
Obese >30	22	4.8 %
Physical activity		
Sedentary	279	61.3 %
Moderate	137	30.1 %
Extreme	39	8.5 %

Faculty and education years of students

This study included all years of medical students at the University of Benghazi, and the results were shown as following majors including medical students (38%), public health (34.5%), pharmacy (14%), and medical technology (7.3 %), and dental (5.9 %). The majority of the students (49 %) were in their fourth year of education; whereas, the remaining represented first year 14. 9 %, second 16 % and third year was 19.8 % (Table 2).

Table-2: Students samples, categorized by education study year and faculty

Faculty	(N)	%	Year	(N)	%
Medical	174	38.24	First	68	14.9
Pharmacy	64	14.1	Second	74	16.26
Dental	27	5.9	Third	90	19. 8
Public Health	157	34.50	Forth	223	49.01
Medical technology	33	7.3	-	-	-
Total	455	100	Total	455	100

Assessment of Total and Plain Water Intake

There is a gender difference in the recommended Institute of Medicine (IOM) Adequate Intakes (AIs) levels for assessing total water intake, of which it is 3 Liter for men and 2.2 Liter for women. The number of males who drank plain water as per the suggested recommendations (8.9%), Females who got less than the recommended daily intake of total water were 85.7% of the total female population compared to 68% for the general male's population. About 22.8 % of males were above the recommended level of total water intake, compared to only 14.3 % for female. The analysis revealed that the plain water intake of all participants was 1627 ± 1100 mL (Mean ± SD), for females it was 1384 ± 992 mL and for males 2190 ±

1363 mL**.** The total water intake for all participants was 2600 ± 1282 mL, for female's 2360 ±1078 mL and for male's 3300 ± 1627 mL. The number of males who drank plain water as per the suggested recommendations (12%) compared with female plain water intake (0%). Furthermore, IOM AIs for the plain water intake, which is 3000 mL for males and 2200 mL for females, found to have more below recommended intakes. Females who got less than the recommended daily intake of total water were 85.7% of the total female population compared to 68% for the general male's population. Plain water were strongly and positively correlated with total water intake (r=0.92, p<0.001) (Table 3).

Table-3: Assessment Total and plain Water Intake by Gender

Gender	Intake Level	Total Water Percent %	Plain Water Percent%
Female	Below Recommendations	85.7%	88%
	Recommended Intake	0%	0 %
	Above Recommendations	14.3%	12%
Male	Below Recommendations	68.3%	60%
	Recommended Intake	8.9 %	12 %
	Above Recommendations	22.8 %	28%

Association of Physical Activity with Total Water Intake of Male

The statistical analysis showed no significant relationship between levels of Physical activity and water intake in male (P=0.136). The results showed that about 10.3% of students with extreme activity consumed less than 3 L/ day and only 0.9% students with extremely active consumed more than 3 L/ day. While in moderately active 20.5% of students consumed less than 3 L/ day of water, 5.8% consumed

more than 3 L/ day of water, and about 3.1% of students consumed 3 L/ day of water. Sedentary student was consumed less than 3 L/ day of water 37.5%, 16.1% of students consumed more than 3 L/ day of water and only 4.9% of students consumed 3 L/ day of water**.** The results also showed that 68.3% students from the total were water consumed less than 3 L/ day, 8.9% consumed 3 L/ day and about 22.8% were consumed more than 3 L/ day (Table 4).

Table-4: The association between Physical activity and total water intake in male

Physical activity	Total water intake for male in liter						Total	
	<3		=3		>3			
	N	%	N	%	N	%	N	%
Extremely active	23	10.3%	2	0.9%	2	0.9%	27	12.1%
Moderately active	46	20.5%	7	3.1%	13	5.8%	66	29.5%
Sedentary	84	37.5%	11	4.9%	36	16.1%	131	58.5%
Total	153	68.3%	20	8.9%	51	22.8%	224	100.0%
P Value 0.136								

Association of Physical Activity with Total Water Intake of Female

The statistical analysis showed no significant relationship between Physical activity level and water intake in female (P=0.670). The results showed that about 4.3% of female students with extreme activity her consumption less than 2.2 L/ day of water and only 0.9% students extremely active consumption more than 2.2 L/ day of water. In moderate activity 27.3% of

students consumption less than 2.2 L/ day of water, and 3.5% consumption more than 2.2 L/ day of water. In sedentary life was higher percentage about 54.1% of student's consumption less than 2.2 L/ day of water, and only 10 % of student's consumption more than 2.2 L/ day of water **.**The results also showed that 85.7% students from the total were water consumption less than 2.2 L/ day, and about 14.3% of females students were consumption more than 2.2 L/ day (Table 5).

Table-5: The association between Physical activity and total water intake in female

Physical activity	Total Water intake in female in liter					
	<2.2 L		>2.2 L		Total	
	N	%	N	%	N	%
Extremely active	10	4.3%	2	0.9%	12	5.2%
Moderately active	63	27.3%	8	3.5%	71	30.7%
Sedentary	125	54.1%	23	10.0%	148	64.1%
Total	198	85.7%	33	14.3%	231	100.0%
P value 0 .670						

Association of BMI with Total Water intake of Male

The association between BMI and total water intake in male, according to total consumption per day for male about 3L/day. The statistical analysis showed no significant relationship between BMI and water intake in male (P=0.845). The results showed that students have BMI Underweight <18.5, were water consumption <3 L/day with percentage 0.9% and >3 L/day was 0.4%. Student have BMI normal 18.5 - 24.9, water consumption <3 L/day were 43 % of students, student have consumption 3 L/day were percentage 6.3%, and about 16.5% were consumption >3 L/day.

student have BMI Overweight 25 - 29.9, water consumption less than 3 L/day were 20.1% student have consumption 3 L/day were 2.2%, and about 4.5% of students were consumption more than 3 L/day. student have BMI Obese 30 or more water consumption less than 3 L/day were 4.0% student have consumption 3 L/day was with percentage 0.4%, and about 1.3 % students were consumption more than 3 L/day. The results also showed that 68.3% students from the total were water consumption less than 3 L/ day, 8.9% consumption 3 L/ day and about 22.8% were consumption more than 3 L/ day (Table 6).

Table-6: The association between BMI and water intake in male

BMI	Total water intake for male in liter							
	<3		=3		>3		Total	
	N	%	N	%	N	%	N	%
Underweight <18.5	2	0.9	0	0	1	0.4	3	1.3
Normal 18.5 - 24.9	97	43.3	14	6.3	37	16.5	148	66.1
Overweight 25-29.9	45	20.1	5	2.2	10	4.5	60	26.8
Obese 30 or more	9	4.0	1	0.4	3	1.3	13	5.8
Total	153	68.3	20	8.9	51	22.8	224	100.0
P Value 0.845								

Association of BMI with Total Water intake of Female

The statistical analysis showed no significant relationship between BMI and water intake in female (P=0 .447). The association between BMI and water intake in female students according to total consumption per day for male about 2.2 L/day and divided in to four groups according to body mass index. The results showed that students have BMI Underweight <18.5, were water consumption <2.2 L/day with percentage 5.6% and students consumption >2.2 L/day was with percentage 1.4%. Student have

BMI Normal 18.5 - 24.9, water consumption <2.2 L/day were students with percentage 60.2%, and about 10.4% were consumption >2.2 L/day. Students have BMI Overweight 25 - 29.9, water consumption <2.2 L/day were 16.9% students, and about 2.2% were consumption >2.2 L/day. Student have BMI Obese 30 or more, water consumption <2.2 L/day were 3.0% and about 1.3% were consumption >2.2 L/day. The results also showed that 85.7% students from the total were water consumption less than 2.2 L/ day, and about 14.3% were consumption more than 2.2 L/ day (Table 7).

Table-7: The association between BMI and water intake in female

BMI	Total water intake for female in liter					
	<2.2		>2.2		Total	
	N	%	N	%	N	%
Underweight <18.5	13	5.6	1	1.4	14	6.1
Normal 18.5 - 24.9	139	60.2	24	10.4	163	70.6
Overweight 25 - 29.9	39	16.9	5	2.2	44	19.0
Obese 30 or more	7	3.0	3	1.3	10	4.3
Total	198	85.7	33	14.3	231	100.0
P value 0.447						

Milk Consumption in Students

The statistical analysis showed no significant relationship between milk consumption and gender P=0.602.The association between milk intake in male and female students according to consumption per day, the results showed that student no milk consumption about 9.0% for male and 8.4% for female students. The results also showed female slightly more consumption for milk than male were 42.4% for female and 40.2% for male students (Table 8).

Table-8: Correlation between milk consumption and gender

Milk consumption	Gender					
	Male		**female**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
No	41	9.0%	38	8.4%	79	17.4%
0.25-1 liter	183	40.2%	193	42.4%	376	82.6%
Total	224	49.2%	231	50.8%	455	100.0%
P value 0.602						

Tea Consumption of Students

The statistical analysis showed highly significant relationship between Tea consumption and gender (P=0.000). The association between tea intake in male and female students according to consumption per day, the results showed that about 13.0% of male and 24.8% of female consumption for tea. the results also showed that about 36.3% of male students and 25.9% of female students were tea consumption from 0.25ml - 1L, male students more consumption of tea than female students (Table 9).

Table-9: Correlation between Tea consumption and gender

Tea consumption	Gender					
	Male		**female**		**Total**	
	N	%	N	%	N	%
No	59	13.0	113	24.8	172	37.8
0.25-1 Liter	165	36.3	118	25.9	283	62.2
Total	224	49.2	231	50.8	455	100.0
P Value 0.000						

Coffee Consumption of Students

The statistical analysis showed highly significant relationship between coffee consumption and gender (P=0.001).The association between coffee intake in male and female students according to consumption per day, the results showed that about 5.5% of male and 11.4% of female students were no consumption of coffee. The results also showed that about 42.6% of male students and 39.1% of female students consumption about 0.25ml -1L of coffee, and consumption more than 1L about 1.1% and 0.2 % for male and female respectively, male students more consumption of coffee than female students (Table 10).

Table-10: Correlation between Coffee consumption and gender

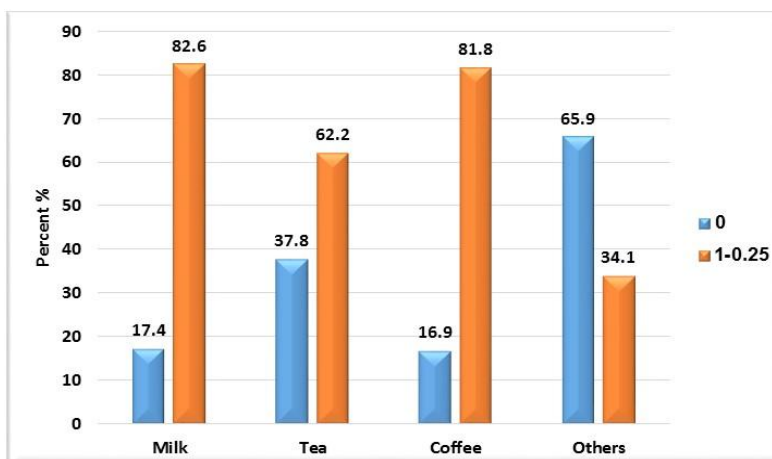| Coffee consumption	Gender					
	Male		**female**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
No	25	5.5%	52	11.4%	77	16.9%
0.25-1 Liter	194	42.6%	178	39.1%	372	81.8%
>1 Liter	5	1.1%	1	0.2%	6	1.3%
Total	224	49.2%	231	50.8%	455	100.0%
P Value 0.001						

Fig-1: **General consumption of milk, tea, coffee, and other beverages in students (male and female)**

Figure showed that 82.6% of students consumption about 0.25-1L of milk, 81.8 of students consumption about 0.25-1L of coffee, 62.2% of students consumption about 0.25-1L of tea and, 34.1% of students consumption about 0.25-1L of other beverage.
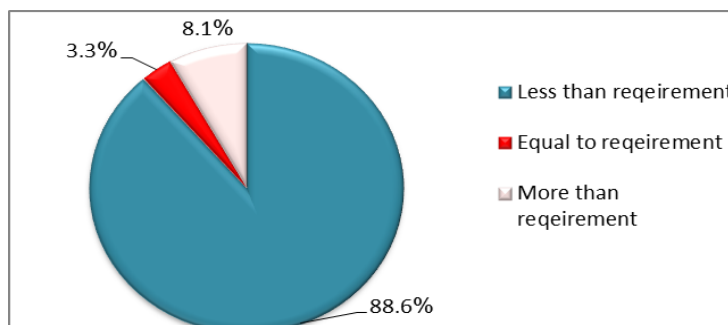
Water and Energy Intake of Students

Fig-2: Distribution of Students According to Energy Intake

Shown, (88.6%) of students consumed "less than the daily requirement", (3.3%) were consumed "equal to requirement" and (8.1%) were consumed "More than requirement". It was found that the daily energy intake of students (Kcal) was positively correlated with total and plain water consumed (r=0.93, p<0.001),) with p value p=0.000.
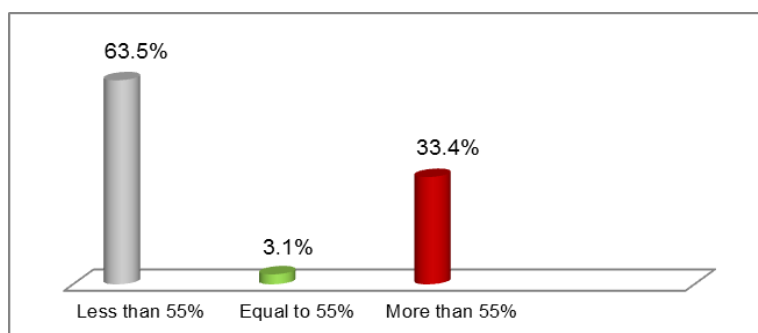
Fig-3: Assessment of daily carbohydrate intake of students

Shown, (63.5%) of students consumed "less than 55%" of daily carbohydrate requirements, (33.4%) of them consumed "more than (55 %") and (3.1%) were consumed "equal to 55%".
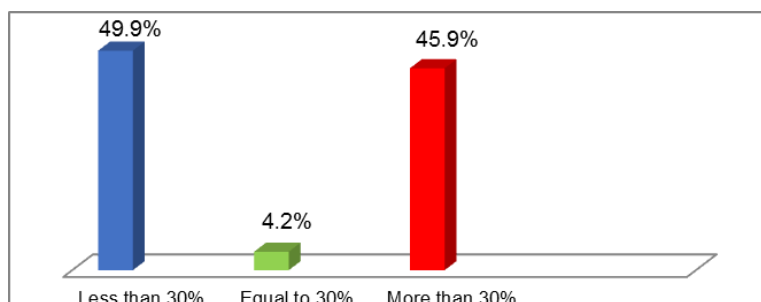
Fig-4: Assessment of daily fat intake of students

Shown, (49.9%) of students consumed "less than 30%" of fat requirements, (45.9%) were consumed "more than 30%" and (4.2%) were consumed "equal to 30% of fat requirements".
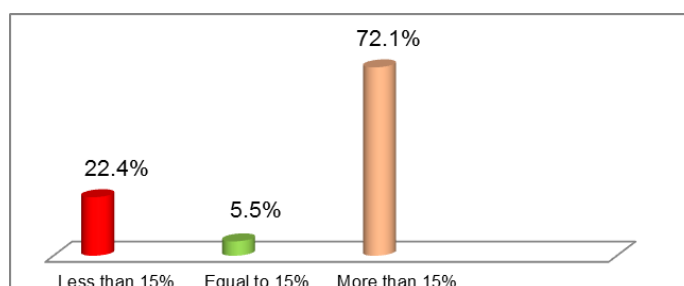

Fig-5: Assessment of daily protein intake of students

Shown, (72.1%) of students were consumed "more than 15%" of protein requirements, (22.4%) of students were consumed "less than 15%" and (5.5%) were protein consumed "equal to 15%".

DISCUSSION

This study was designed for evaluate the plain and total water intake (drinking fluids and water from foods) for medical college students in Benghazi University. A total number of (455) samples of medical college students where collected randomly, were divided to 224 samples male and 231 samples female aged from 19-30 years, were collected from five faculty including: medical, pharmacy, public health, dental and medical technique for all study years First, Second, Third and fourth. The results of this study revealed that the total water intake (water obtained from plain water, beverages and foods) among all participants, is 2600 ± 1282 mL, the plain water intake (pure water) of all students, 1627 ± 1100 mL, This is higher than the results that was presented by Drewnowski et al. in assessment of plain water in the younger adults group (20-50 years) which was 1294 mL for plain water and lower than total water 3560 ml [36]. Definitely, the results of assessed total water value are also considered lower than the reported level in Kant and Graubard [37] study which was 3180 mL conducted from a single 24-hr dietary recall in a national representative sample. The results of the current study suggest that gender is associated with total water intake and plain water intake, of which men had better adherence to the recommended intake levels were 68% of males and about 85.7% of females failed to meet the recommended values of total water. This indicates that

men had slightly better compliance with the total water. Recommendation the male sample had a higher intake of pure water and of fluids obtained from pure water and beverages. Simillarly study by Alanazi 2018 [23], females' plain water intake was found to equal 1374 mL, and males' plain water was 2183 mL, while 82 % of females and only 66 % of males failed to adhere to the recommended IOM AIs (males: 3000mL; females: 2200 mL). On the contrary, study conducted on thirteen countries in 2015 by Ferreira-Pêgo et al. investigated, men showed lower adherence to recommended levels compared to women, who showed more two-fold increase in the likelihood of adherence to water consumption recommendations [38]. Similarly, the results are discounted by Bellisle et al. who found that females have better compliance with the recommended [39].

Present results also show that Plain water were strongly and positively correlated with total water intake (r=0.92, p<0.001), males' plain water intake (2190 ± 1363 mL) is higher than females' plain water intake (1384 ± 992 mL). Also the total water intake for male's 3300 ± 1627 mL is higher than females total water intake 2360 ±1078 mL. Likewise results of the assessed total water intake by gender showed that males' total water intake again is higher than females' intake. These findings suggested that in this study the male sample had a higher intake of pure water and of fluids obtained from pure water, beverages and foods [23]. Furthermore, IOM AIs for the total water intake, which is 3000 mL for males and 2700 mL for females, found to have more below recommended intakes. This indicates that men had slightly better compliance with

the total water recommendation (IOM AIs). Moreover, our results are not consistent with Drewnowski et al. [36], who found that gender does not affect water intake.

The results showed that students aged between 23-26 years, n 321 (70.5%) were the higher percentage between students. In our study the highest percentage of students in normal range of BMI especially in female. the majority of the participants male and female have normal body mass index especially female, were the results showed that 68.3% of students have BMI (normal), 22.8% of them have a (over weight) BMI, 5% of students were BMI (obese), and 3.736% of them have BMI were (underweight). Similarly to a study conducted in 2018 by Sprake et al., the majority of the participants male and female have normal body mass index especially female [40]. However contrast with recent study by Teng et al., that showed overweight among the students was high at 23.9% [41], in comparison with our study the 66.1% in male and 70.6% in female of normal body mass index was the higher percentage. The rationale behind the difference of previous results about the MBI may be due to different life styles of university students in different situation and different dietary pattern [42].

Also comparison with study by Balaghi et al., fluids intake and beverage consumption pattern among university students, the results showed that general characteristics of students in both genders about 80% of students had normal BMI, their fluid intake was lower than recommended values [43]. Thus agreement with our work was the students consumed lower than the recommended intake for both gender.

The association between Physical activity, and water intake in male in this study the results showed that about 58.5% of students were sedentary life, 37.5% of them consumption less than 3 L / day, comparison with female 64.1% of students were sedentary life 54.1% of them consumption less than 2 L/day. The results also revealed that female and male nearly the same consumption about 193 (42.4%) of female,183 (40.2%) male students, in contrast male students more consumption of Tea than female about 165 (36.3%) of male students and 118 (25.9%) of female students, and about (42.6%) of male students and (39.1%) of female students consumption about 0.25ml -1L of coffee, while consumption for other beverages almost same about 80 (17.6%) of male students and 75 (16.5%) of female students. Thus more than the percentages that found with other study sweetened coffee or tea (18.4%) and full cream milk (9.6%). Besides plain water, most of the subjects consumed only ≤1 cup of the beverage each time [37]. Our work results found that daily energy intake is positively correlated (r= 0.93, p=0.000) with both plain and total water intake, which is supported by Lee et al.'s research [44]. in similar An Assessment of Daily Plain Water Intake Level and Its Association with

Total Energy Intake Among College Students it was found that the daily energy intake (Kcal) was positively correlated (r=0.50) with total water intake (mL) with p value p<0.001 [23]. However, our results contradict the negative correlation discovered by Ann and McCaffrey who reported with every 1% increase of plain water in total water, the daily energy decreased by 8.5 Kcal [45]. Alternatively, findings from Kant and Graubard stated that dietary energy intake is unrelated to plain water intake [37].

CONCLUSION

Our conclusion is that, the student's consumption of water less than the recommended (3 L/ day for male, 2.2 L/day for female). Encourage students for drinking enough water with exercise, such as walking, for students who are body mass index overweight or obese. Reducing the consumption of stimulants such as coffee and tea and, replacing them with drinks that are beneficial to the student. These findings suggest that more efforts must be done to encourage young students to consume more water as a measure for maintaining overall health and wellness.

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