**Nutritional Knowledge, and Nutritional Status of**

**Energy Drink Consumers in Medical Students of**

 **Benghazi University**

**Abstract**

**Background**: Excessive consumption of energy drinks by young adults and athletes raises health risks like cardiovascular problems, nervous system disorders, and addiction, and because of these concerns the study targeted young adults among college students in Libya ,where there has been no research regarding energy drink consumption patterns among them

**Objective**: This study aimed to analyze energy drink consumption patterns among college students, their prevalence and frequency, and evaluate their nutritional status and knowledge.

**Method**: A cross-sectional study was conducted on 200 medical students aged 20-31 in Benghazi, Libya, to assess their nutritional status. The study involved questionnaire which include anthropometric measurements, clinical information, and dietary habits. The study also measured energy drink frequency and use nine nutrition-related questions adapted from a standard nutrition knowledge to assess nutrition knowledge of participants. The data was analyzed using descriptive statistics and the Chi-Square test and approved by the university's ethics committee.

**Results**: Data shows the consumption of energy drinks is relatively high amongst student’s

participants of Benghazi University, 60% were consumers, and less than half of the participants

(40%) were non-consumers. The consumption of energy drinks among male group more than female group . The result demonstrated that the majority of consumed energy drinks were medical students, however, the relation between energy drinks uses and different colleges participants appeared to be un significant , however, the association between energy drink intake and gender was significant. Regarding BMI most of students were uses of energy drinks had normal BMI, the results showed the correlation between consumption of energy drinks and participant’s BMI was indicated unsignificant.

**Conclusion**: The study reveals high energy drink consumption among Benghazi University students, with 60% being consumers and 40% being non-consumers. The majority are male, with a higher consumption among medical students. The relationship between energy drink use and college was unsignificant, and the correlation between energy drink consumption and BMI was unsignificant

. **Keywords**: energy drink, side effect of energy drink, nutritional status, energy drink consumption, nutrition knowledge, college students

**1. Introduction**

Consumption of energy drinks has surged due to aggressive marketing targeting young adults and adolescents, emphasizing their energizing effects and association with extreme sports. many People believe that mental and physical performance can be enhanced , boosting energy levels, focus, and athletic performance.(1)

Energy drinks (EDs) are defined by the Food and Drug Administration (FDA) as "a class of products in liquid form that typically contains caffeine, with or without other added ingredients.” Legal stimulants like taurine, L-carnitine, and guarana are sometimes used, along with other chemicals, extra sweets, and high levels of caffeine. In addition to increasing blood pressure, pulse rate, and respiration, these legal stimulants can also improve alertness, focus, and vitality. These substances are advertised as enhancing mental and physical performance. (2,3)

Protano et al.'s study, which focused on college students (those between the ages of 18 and 24), found that 42.9% of them regularly used ED [4]. However, a thorough investigation by Verster et al. and De Giorgi et al. concentrated on the prevalence of ED in conjunction with alcohol rather than just the prevalence of ED usage. [5,6]. Aprimary drawback of earlier studies is that they combined the past-year and past- In month prevalences to determine the pooled prevalence of ED usage [6]. According to Khouja et al.'s comprehensive analysis of ED use based on nationwide surveys conducted in the UK, weekly intake varied between 3 and 32% and past-year prevalence ranged between 13 and 67% for children and adolescents (those under the age of 18) [7].

One study was conducted by OMAR, Hajer, et al. in Benghazi, Libya. 480 secondary school students took part in the study, which concentrated on their consumption patterns and their understanding of the impacts of energy drinks. According to the results, 34.38% of the participants were consumers, whereas 315 (65.63%) were not. The overwhelming majority of customers (65.63%) are sufficiently informed about the effects of energy drinks on the body and intellect. Nevertheless, 63.54% of them are unaware of the energy drink's components [8]

Energy drinks are advertised among a diversity of subpopulations, including college students, athletes, and commercial bus drivers, on the basis of their purported enhancement of mental or physical performance [9].

The use of energy drink has been linked to detrimental health outcomes, including as adversely impact to the cardiovascular, endocrine, and reproductive systems, as well as to the lungs, liver, and kidneys [10]. Energy drink consumption has been connected to mental health effects such anxiety, stress, depressive symptoms, thoughts of suicide, and sleep disruptions in addition to a variety of physical issues. [11]. Additionally, the combination of these medications can result in cardiovascular issues (e.g., arrhythmias) and chronic consequences that damage the liver (cirrhosis, fatty liver disease, etc.) [ 11].].

Despite the fact that energy drink consumption is clearly observed in many community settings, there are little studies on the subject in Libya. The Global Energy Council reaffirmed this warning.For this reason the current study aimed to assess the frequency and prevalence of energy drink consumption among students in Benghazi university ,aswellas ,evaluating these energy drink consumers' nutritional status using BMI, doing specific clinical inve4stigation, and determining whether there are any meaningful connections between energy drink intake and the nutrition metrics under research. More over, to examine the socioeconomic factors related to ED consumption among University of Benghazi students, as well as the pattern and motive of ED consumption.. Additionally,to examine reasons and occasions for the consumption among students and awareness on associated potential health problems , and side / adverse health effects associated with energy drink users. From the findings of this study we hope to provide valuable insights that can inform students’ choices and promote healthier study habits.."

**2. Methodology**

**2.1. Study Design, setting and Subjects**

in four medical colleges at Benghazi University as A cross-sectional study was conducted, with 200 participants, including 50 from each college, table 1 below illustrated all previously mentioned , aged 20 and over. Data on demographic issues, energy drink consumption, and anthropometric variables were collected using a well-structured questionnaire. The study included undergraduate students from four Benghazi University colleges, including both Libyan and non-Libyan students, irrespective of their energy drink consumption.

 **Table(1) : Distribution of students among colleges**

|  |  |  |
| --- | --- | --- |
|  | **Frequency** | **Percent** |
| **Valid** | **Medicine** | 50 | 25.0 |
| **Public health** | 50 | 25.0 |
| **Pharmacy** | 50 | 25.0 |
| **Biomedicine** | 50 | 25.0 |
| **Total** | 200 | 100.0 |

**2.2. Procedure and Materials**

The study, conducted from January to March 2024, involved 200 students from various colleges, including Public Health, pharmacy, medicine, and Biomedicine. Participants were made aware of the goal of the study, that participation was optional, and that they might leave at any moment. All responses were kept confidential and anonymous.

This study collected data from 200 undergraduate students using a structured questionnaire, anthropometric measurements, and instruments like a flexible tape measure, stadiometer, and weight scale. The questionnaire assessed demographic data, socioeconomic background, Anthropometric assessments included the participants' height, weight, and body mass index (BMI), as well as their dietary and medical histories. The Nutrition knowledge assessment involved the use of 9 nutrition-related questions was employed to assess the level of nutrition knowledge, nutritional habits of drinking energy drinks, use of energy drinks, reason for consumption, Participants' nutritional intakes were estimated using the food frequency questionnaire (FFQ), a 24-hour dietary recall, and other methods. Before data collection started, the questionnaire was piloted. Other goals of the research was on study the knowledge of participants on the usage of the ED and ED contents, as well as, if there is a significant relation between the knowledge and consumption.

**2.3. Assessment of Nutritional status**

A multidimensional approach was proposed to assess nutritional status in students, including body composition, dietary intake, and biochemical measures, classifying them into normal and malnutrition risk groups.

**2.4. Nutrition knowledge assessment and its classifications**

The study used a nutrition knowledge assessment tool, the General Nutrition Knowledge Questionnaire (GNKQ), to evaluate undergraduate nutrition knowledge among the studennts at four collges of Benghazi University proving its validity [12]

Based on their Nutrition Knowledge score points, the research participants were divided into three classifications . Poor knowledge was defined as having scores between 0 and 3. Fair knowledge was indicated by scores ranging from 4 to 6.Knowledge of nutrition was good for those with scores of 7-9.

The study assessed nutritional status through laboratory investigations, including serum hemoglobin levels, S. cholesterol, and BMI. Despite the absence of biochemical markers, anthropometric measurements were used to evaluate participants' weight, height, and BMI, which were calculated using BMI.

**2.5. Statistical analysis:**

The results were analyzed using descriptive statistics after the data was analyzed using SPSS 21 and the Chi-Square test, with a P-value of less than 0.05 indicating statistical significance.

**2.6. limitations**

The study has limitations, including a limited sample of medical students and missing biochemical indexes of nutritional status. It serves as a pilot for future prospective studies. The study also failed to confirm side effects from energy drink consumption and found a predominance of female responders in the medical group.

1. **Results**

**3.1.Demographic characteristic and clinical information of the participants**

**3.1.1.Description of study participants**

A total of 200 students aged between 20 to 31 years old were enrolled for the study.Out of the total sample, 19% (n=37) respondents were males and 81% (n=163) were females .Regarding to marital status, we shown the most of students participants in this study was single were about 91% ,however, 9% were married.

**Table (2): Socio-demographic characteristics of participants**

|  |
| --- |
| **Demographic data** |
| **Variables** |  | **Frequency** | **Percent %** |
| **Gender** | **Male** | 37 | 18.5 |
| **Female** | 163 | 81.5 |
| **Age groups** | **20 - 25 years** | 170 | 85.0 |
| **26 - 31 years** | 30 | 15.0 |
| **Nationality** | **Libyan** | 197 | 98.5 |
| **Non-Libyan** | 3 | 1.5 |
| **Marital Status** | **Married** | 18 | 9.0 |
| **Single** | 182 | 91.0 |
| **Student year** | **First Year** | 33 | 16.5 |
| **Second Year** | 47 | 23.5 |
| **Third Year** | 42 | 21.0 |
| **Fourth Year** | 71 | 35.5 |
| **Fifth Year** | 7 | 3.5 |
| **Family income** | **Low** | 8 | 4.0 |
| **Middle** | 138 | 69.0 |
| **Good** | 54 | 27.0 |

**3.1.2Association between demographic characteristics and energy drink users**

Our result demonstrated that association between energy drink intake and gender was significant (P value=.011), however, there was no relation between the family income and energy drink use P=(value0.553).

**Table (3) Association between gender, family income and energy drink use**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consumption ED** | **Total** |  |
| **Don't drink** | **drinks energy drinks** | **P – value** |
| **Gender** | **Male** | 8 | 29 | 37 | 0.011\*\* |
| **Female** | 72 | 91 | 163 |
| **Total** | 80 | 120 | 200 |
| **Family income** | **Low** | 2 | 6 | 8 | 0.553 |
| **Middle** | 58 | 80 | 138 |
| **Good** | 20 | 34 | 54 |
| **Total** | 80 | 120 | 200 |  |

* 1. **Assessment of nutritional status of energy drink users**
		1. **Body mass index of participants**

Regarding the participants BMI, 61% were within the normal range, 25% were pre-obese, 9.5% were grad1obese, 1% grad 3 obese and 3.5% were underweight as revealed in figure (1).



**Figure(1): BMI of participants**

* + 1. **Association between BMI of partticipants and energy drink users** As demonstrated in the (table 4) most of students who normal BMI were uses of energy drinks which was 59% (n=72) students and the majority 62%(n=31) was pre-obese students was also consumed of energy drink, 73%(n=14) of class I obese also consumed energy drinks however, 41%(n=50) students were do not consumed of energy drinks was normal body weight while 38%(n=19) of pre-obese students were do not used energy drinks. Regarding the underweight and class I obese, only 5 students were do not consumption of energy drink. BMI was indicated insignificant P value(0.333).

**Table(4) : BMI and consumption of energy drinks among participants**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consumption ED** | **Total** |  |
| **Don't drink** | **drinks energy drinks** | **P – value** |
| **BMI** | **Underweight** | Count | 5 | 2 | 7 |  |
| % within BMI | 71.4% | 28.6% | 100.0% | 0.333 |
| **Normal Weight** | Count | 50 | 72 | 122 |
| % within BMI | 41.0% | 59.0% | 100.0% |
| **Pre-Obesity** | Count | 19 | 31 | 50 |
| % within BMI | 38.0% | 62.0% | 100.0% |
|  | Count | 5 | 14 | 19 |
|  | **Consumption ED** | **Total** |  |
| **Don't drink** | **drinks energy drinks** | **P – value** |
|  | **Obesity- Class1** | % within BMI | 26.3% | 73.7% | 100.0% |  |
| **Obesity- Class3** | Count | 1 | 1 | 2 |
| % within BMI | 50.0% | 50.0% | 100.0% |
| **Total** | Count | 80 | 120 | 200 |
| % within BMI | 40.0% | 60.0% | 100.0% |  |

* + 1. **Clinical investigation**

The tables below (5 A,B) showed that the majority of students did not have a pallor face, among both group ( drinks users and non users) which was 80%, while only 20% had pallor for both group. The majority of students with normal blood pressure, which was (85.5%,80%) among energy drinks users and non-users respectively, while (11.7%,18.8%)suffered from hypotension among energy drinks users and non-users respectively, as well as the least of students (1.3%,2.5%) were had hypertension among energy dinks consumed and non-consumed respectively.

**Table (5): clinical information among participants**

|  |  |
| --- | --- |
| **Clinical investigation** | **Clinical investigation** |
| **(drinks enrage drink** | **(don't drink enrage drink)** |
| **Variables** |  | **Frequency** | **Percent %** |  | **Frequency** | **Percent %** |
| Pallor | Yes | 24 | 20.0 | Yes | 16 | 20.0 |
| No | 96 | 80.0 | No | 64 | 80.0 |
| Bitot’s spots on the eyes | Yes | 4 | 3.3 | Yes | 5 | 6.3 |
| No | 116 | 96.7 | No | 75 | 93.8 |
| GIT Nausea | Yes | 23 | 19.2 | Yes | 8 | 10.0 |
| No | 97 | 80.8 | No | 72 | 90.0 |
| GIT Vomiting | Yes | 7 | 5.8 | Yes | 4 | 5.0 |
| No | 113 | 94.2 | No | 76 | 95.0 |
| GIT Loss of appetite | Yes | 36 | 30.0 | Yes | 22 | 27.5 |
| No | 84 | 70.0 | No | 58 | 72.5 |
| B.P | Normal | 103 | 85.8 | Normal | 64 | 80.0 |
| Hypotension | 14 | 11.7 | Hypotension | 15 | 18.8 |
| Hypertension | 3 | 2.5 | Hypertension | 1 | 1.3 |

* + 1. **Dietary history**
			1. **pevalence of Energy drinks consumption and distribution of energy drinks consumption between faculty:**

Figure (2) shows that out of the 200 studied participants (60% were consumers, and less than half of the participants (40%) were non-consumers. Table (6) shows the distribution of consumption between faculty (Medical, Public Health ,Pharmacy, Biomedician) . The result demonstrated that (68%) of medical students were consumed energy drinks, compared to (32%%) was did not energy drinks of the same college. Regarding faculty of pharmacy , 60% of respondents were consumed of energy drinks, whereas 40% of students don’t energy drink user. Results reveal that 58% 0f public Health students were consumed of energy drink , while about 42% they do not drink of energy drinks. Regarding Biomedician students , we shown 54% were consumed energy drink , while those how do not consume of energy drink was 46%.



**Figure (2) The prevalence of energy drink users of studied sample**

The Table (6) showed no significant relation between energy drinks uses and different participants colleges at the university (P value=0.539).

**Table (6) distribution of energy drinks consumption between faculties**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consumption ED** | **Total** |  |
| **Don't drink** | **drinks energy drinks** | **P - value** |
| **Faculty** | **Medicine** | Count | 16 | 34 | 50 |  |
| % within Faculty | 32.0% | 68.0% | 100.0% | 0.539 |
| **Public health** | Count | 21 | 29 | 50 |
| % within Faculty | 42.0% | 58.0% | 100.0% |
| **Pharmacy** | Count | 20 | 30 | 50 |
| % within Faculty | 40.0% | 60.0% | 100.0% |
| **Biomedicine** | Count | 23 | 27 | 50 |
| % within Faculty | 46.0% | 54.0% | 100.0% |
| **Total** | Count | 80 | 120 | 200 |
| % within Faculty | 40.0% | 60.0% | 100.0% |

**3.2.4.2 Frequency of energy drinks habits among consumptioners (daily,weekly, monthly)**

Table (7) reveals that number of students usually daily drunk of energy drinks were 17.5% (n=21) and 41.7% were weekly consumed of energy drinks. Also, from the studied sample we shows the participants who monthly consume of energy drinks was 40.8%(n=49). Students were consumed of energy drinks 3-5 times per week which about 6.7% while 93.3% were did not consume . Almost of participants who consumed energy drinks were shows with one time per week which about 45%(n=54) and about 55%(n=66) of those they did not consumed atoll.

**Table(7): consumption of energy drinks habits among participants**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Frequency** | **Percent %** |
| **How many students usually daily drink can** | **per day** | 21 | 17.5 |
| **per week** | 50 | 41.7 |
| **per month** | 49 | 40.8 |
| **3\_5time per week** | **Yes** | 8 | 6.7 |
| **No** | 112 | 93.3 |
| **1\_2times a week** | **Yes** | 34 | 28.3 |
| **No** | 86 | 71.7 |
| **2\_4times per week** | **Yes** | 16 | 13.3 |
| **No** | 104 | 86.7 |
| **=<1 time** | **Yes** | 54 | 45.0 |
| **No** | 66 | 55.0 |

**3.2.4.3 Reasons and Occasions for consuming energy drinks**

Table (8) below shows that the highest percent in our sample was consumed of energy drinks for increase study and work concentration, which about 40%(n=48), while 20 % (n=24) of studied sample was drink of energy drinks

for keeping a week, 18.4% (n=22)of participants appeared to be consumed of energy drinks for increase physical activity. Also 18.3% of our sample who consumed energy drinks for unknown reason, however, 0.8% of participants notes consumed of energy drinks for driving for long time. Inaddition, The highest percentage appeared for those who used energy drinks without special event which was 40%(n=48), and the least percentage was 7.5%, which for those who used it for Doing sports studding, about 33.3% (n=40) of participants was consumed it before exams and 9.2 % of participants consumed it at parties and 10 % use it for other occasions.

**Table (8) : reasons for energy drinks consumption by students**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Reasons**  | **Frequency** | **Percent %** |
| **Which effects do you think energy drinks have?** | **Increase physical****resistance** | 22 | 18.4 |
| **increase study/work****concentration** | 48 | 40.0 |
| **keep awake** | 24 | 20.0 |
| **Drive a long time** | 1 | 0.8 |
| **I don't know** | 22 | 18.3 |
| **Other please** | 3 | 2.5 |
|  | **Occasion**  | **Frequency** | **Percent %** |
| **What occasions do you use energy drinks?** | **No need for occasions** | 48 | 40.0 |
| **Doing sports studding** | 9 | 7.5 |
| **Before exams** | 40 | 33.3 |
| **At parties** | 11 | 9.2 |
| **Other** | 12 | 10.0 |

**3.2.4.4 Side effects caused by energy drinks.**

Table (9) below shows that 56% of participants did not have any side effects after Energy drinks consumption, however, 44% were had side effect.see the figure which illustrate the frequency of experience any side affect after consumption.

**Table (9) side effects of energy drinks among participants group**

|  |  |  |
| --- | --- | --- |
| **Side effects after ED consumption** | **Frequency** | **Percent %** |
| Yes | 53 | 44.2 |
| No | 67 | 55.8 |

**Figure (3) show the frequency of experience any side affect after consumption**

* 1. **Nutritional Knowledge:**
		1. **Assessment of nutritional knowledge using the general nutritional knowledge questionnaire for adults**

Figure (4) a majority of the participants 66% of the group members had good nutrition knowledge (scores7-9) and 32% of the participants were found with fair knowledge (scores 4-6) , while the lowest level was among of poor knowledge which was 2% (scores 0-3).



**Figure (4): distribution of sample according to their nutritional knowledge**

**Association between Nutrition knowledge assessment and energy drink users:**

The Nutritional knowledge Score was analyzed for association with energy drinks user, highest number of participants were appeared with good nutrition knowledge was among energy drinks user, which was 78 and , 40 of drinks users were found to be fair nutrition knowledge , while only 2 of those was poor nutrition knowledge. Regarding with participants who did not energy drinks user 54 were found with good nutrition , 24 of the same group were with fair knowledge , however , the least number of participants (2) were found with poor nutrition knowledge among did not energy drink user . These results are presented in Table (10).

As shown in our result (table 10), We found no significant relation between Nutrition Knowledge Score and energy drinks user P value (0.827).

**Table (10): nutrition knowledge score and energy drinks user**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Nutrition knowledge assessment** | **Total** | **P -****value** |
| **Poor knowledge** | **Fair knowledge** | **Good nutrition****knowledge** |
| **Consumption ED** | **Don't drink** | 2 | 24 | 54 | 80 |  |
| **drinks energy drinks** | 2 | 40 | 78 | 120 | .827 |
| **Total** | 4 | 64 | 132 | 200 |  |

* + 1. **Knowledge about energy drink content**

Results reveals that 55.8% (n=67) of student’s participants were believed that energy drinks contain caffeine and 22.5% (n=27) of participants thought that energy drinks contain sugar , while 10.8% (n=13) of participants believed that energy drinks had both caffeine and sugar, Regarding the knowledge about if energy drinks contain vitamins or not, the study showed that 1.7% (n=2) of students believed that the energy drinks contain vitamins against 9.2% (n=11) of students believed that the energy drinks contain all ( sugar, caffeine, vitamin) .Table ( 11) illustrates all previously mentioned.

**Table (11): distribution of sample according to their believes of energy drinks contain.**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Frequency** | **Percent %** |
| **Which of these substances do you think are contained in energy drinks?** | Caffeine | 67 | 55.8 |
| Vitamins | 2 | 1.7 |
| Sugars | 27 | 22.5 |
| All | 11 | 9.2 |
| Caffeine and Sugars | 13 | 10.8 |

**4. Discussion**

In this study, we aimed to estimate the prevalence and nutritional status and knowledge of a sample of medical students at Benghazi University. The most significant determinants identified were female gender, students were enrolled for the study aged between 20 to 31 years old, most of age group in study sample was 20-25 year. Majority of participants were of Libyan nationality. The most of family income in our sample were middle income. Regarding to marital status, we shown the most of student’s participants were single , the highest percent of students participants was at fourth year. Our study, a significantly higher proportion of male students reported that they consumed energy drinks, although most of the student's participants were female gender, several studies have reported similar findings. The preponderance of males has been reported by many Saudi studies as well. [ 13]. In our opinion, the most probable reason for this is the general attitude of young male students of taking more risks, getting involved in more physical activity, more peer pressure, careless behavior, and leaving examination preparation to the last minute adding to the stress.Our results indicated that the association between gender and energy drinks, based on result showed the excess of energy drinks intake was among the male group and the result demonstrated that association between energy drink intake and gender was significant (P value=.011). Similarly , A study from Jeddah reported that the consumption of energy drinks was associated with male gender studying in private colleges (P < 0.05) [49].As mentioned previously our result reveals that , 61% of participants were within the normal range, 25% were pre-obese, 9.5% were grad1obese ,1 % grad 3 obese and 3.5% were underweight. The majority 62% was pre-obese students was consumed of energy drink ,While the most of students who normal BMI were also uses of energy however, 41% students were do not consumed of energy drinks was normal body weight while 38% of pr-obese students were don’t used energy drinks . Regarding the underweight and class I obese only 5 students were do not consumption of energy drink . Similar to other study done by Tan et al. (2008) found 17 %of USA college students overweight were drunk energy drink [14], Sop et al. (2010) reported 20 % of Cameroonian university students being overweight also used energy drinks[15]. With regard to association between BMI and energy drinks users the correlation between consumption of energy drinks and BMI was indicated unsignificant P value(0.333).Similarly Study was done by Nti CA et al. reported that there was a negative and statistically insignificant correlation (r2 = -0.055) between frequency of consumption of energy drinks and nutritional status [16].

Our results indicated that most of studied participants shows drinks users which was 60% and less than half of the participants (40%) were non-consumers, we also found that the distribution of consumption between faculty ( Medical, Public Health ,Pharmacy, Biomedician ). 68% of medical students were consumed energy drinks, 60% among pharmacy respondents 58% reveal among public Health students , 54% regarding Biomedician students. In addition, the result

 demonstrated that there was showed no significant relation between energy drinks uses and different participants colleges at the university. Similarly, several studies on prevalence of energy drinks use , a total of 71 articles published between 2007 and 2021 estimated overall prevalence of energy drinks consumption was 42.9% in undergraduate students (95% confidence interval, 42.5%–43.3%), with significant heterogeneity among studies[17 ]. Study was done by Seifert etal reported that the students of nonmedical colleges of the university consumed more energy drinks [18]. This was probably because medical students had more knowledge of the potential effects and side effects of different substances than students in nonmedical colleges.

These study were disagreement with our result which 53 was found that the majority of energy drinks users was the medical students. About the reasons for consumed energy drinks , in present study most of participants in our sample were consumed of energy drinks for increase study and work concentration , which about 40%, while 20% of was drink of energy drinks for keeping a week, 18% appeared to be consumed of energy drinks for increase physical activity. Also 18% of our sample who consumed energy drinks for unknown reason , however , other study was done by Protano et al. illustrated that the main reasons for use were engagement in study, projects or examinations, stay awake or alert, and physical activity/sport engagement [17]. Regarding side effects of energy drinks users, in the current result shows that 56% of participants did not have any side effects after Energy drinks consumption, however, 44% were had side effect. The most common side effects among participants, were Anxiety and palpitations which was 28%, The least common side effect was headache 10% . Likewise other study , the result confirmed that more than half of (52.61%) consumers reported no adverse effect of the energy drinks. On the other hand previous study performed a detailed about the side effects which reported about (30.62%) of students consumed energy drinks had Increased urination, insomnia, abnormal heart rhythm, and irritability were the most frequent adverse effects [19]. Nutrition knowledge assessment, revealed that a majority of the participants 66% of the group members had good nutrition knowledge and 32% of the participants were found with fair knowledge , while the lowest level was among of poor knowledge which was 2% as well as, the result demonstrated that Nutrition Knowledge Score had un-significant relation with energy drinks user P value (0.827).These findings are similar to Barzegari et al. who reported that 57% of Iranian college students studied had average nutrition knowledge with only 19% having poor knowledge[20]. Similarly, a study of college athletes in the USA by Dunn et al. reported that 47% had poor nutrition knowledge [21].

**5. Conclusion**

In conclusion, the researchers concluded that the consumption of energy drinks is relatively high amongst student’s participants of Benghazi University. most of participants who energy drink user was between age group 20-25years old , the highest percent student’s participants were at fourth year. The result demonstrated that the majority of consumed energy drinks were medical students. Our result demonstrated that association between energy drink intake and gender was significant , however, the relation between marital status and respondents energy drinks user was un-significant. Most of student’s BMI were uses of energy drinks had normal BMI, the results showed the correlation between consumption of energy drinks and participant’s BMI was indicated unsignificant. Our result showed the association between number of meals and energy drinks users was significant. We also found that most kind of energy drinks consumed by student’s participants was Max fly. The reasons and occasions for consuming energy drinks, the result shows the highest percent in our sample was consumed of energy drinks for increase study and work concentration and the most of those consumed it for without special event. The result shows that more than half of participants did not have any side effects after energy drinks consumption, while the most common side effects among participants, were Anxiety and palpitations. Regarding nutritional knowledge , a majority of the participants had good nutrition knowledge, while the result found no significant relation between Nutrition Knowledge Score and energy drinks user.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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