

Energy Drinks Consumption, Knowledge, and Beliefs among Medical University Students in University of Zawia: A Cross-Sectional Study

Hana Alazraq¹ , Shahrazad Gazeti¹ , Salihah Mustafa² , Mufida Khetresh³ , Reemah Almadah¹ , Karima Elalagi¹ 

¹Department of Pharmacology, Faculty of Medicine, University of Zawia, Zawia, Libya

²Department of Pharmacology, Faculty of Medicine, Omar Almokhtar University, Albydah, Libya

³Department of Community, Faculty of Medicine, University of Zawia, Zawia, Libya

Corresponding email. s.gazeti@zu.edu.ly

Abstract

Recently, energy drink consumption has become very common among teenagers and young adults. This study aimed to assess the frequency and usage pattern of energy drinks consumption among university students in Zawia, Libya, and their knowledge and beliefs about the effects of energy drinks. A cross-sectional survey of 180 students from three different medical colleges (medicine, dentistry, and pharmacy) at Zawia University was conducted, with data collection taking place through a self-administered questionnaire between October 2023 and January 2024. The majority of participants (52.2%) were aged 22–24 years, with females comprising 77.8% of the sample. Only about 12.2% consume them regularly, and 30.0% occasionally. About 72.7% of the students reported drinking one can of energy drink per day, with the most common reasons given by the respondents for using energy drinks being to enhance alertness, overcome apathy and lethargy, and approximately 10.0% used them to improve athletic performance before exercise. The major side effects experienced by this study were headaches (23.3%) and sleep disturbances (15.0%). College affiliation also showed a significant association, with medical students reporting the highest consumption, followed by students in dentistry and pharmacy. Exam periods were strongly associated with energy drink consumption of participants who consumed energy drinks during exams. The study reported that ED consumption among students at Zawia University was low, which might be due to gender differences. This study determined that consumption of EDs is relatively high among students at the medical college in comparison to dentistry and pharmacy colleges.

Keywords. Energy Drinks, Consumption, Knowledge, Medical Student, University of Zawia.

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Introduction

Nowadays, teenagers and young adults are the prime targets of the energy drink (ED) market. This age group is more likely to have an “on-the-go” lifestyle and be strongly influenced by their peers; therefore, consumption of EDs may seem more appealing and attractive. A lack of knowledge or awareness of the health risks and conflicting messages from the media can further influence their behaviors [1]. The popularity of ED is attributed to its effect in improving physical or cognitive performance and should not be confused with isotonic drinks or sport drinks [2]. The consumption of EDs is not a new phenomenon; EDs first appeared in Europe and Asia in the 1960s. ED compositions vary widely, and manufacturers often do not disclose the exact quantities of particular ingredients [3]. Energy drinks appear to contain mainly caffeine, which may be combined with other ingredients such as guarana, taurine, ginseng, high levels of sugar, and small amounts of vitamins and minerals [4]. On average, the caffeine content in EDs ranges from 75 to 240 mg compared to the 77–150 mg of caffeine in a cup of coffee. The United States Food and Drug Administration (FDA) recommends that energy drinks contain no more than 65 mg of caffeine per 355 ml [5]. The primary health concern associated with the overconsumption of EDs includes cardiovascular-related problems that could become severe enough to require emergency care [6]. In addition, caffeine and glucose can ameliorate deficits in cognitive performance and subjective fatigue during extended periods of cognitive demand [7]. Caffeine acts as a central nervous system stimulant via the inhibition of nonselective adenosine receptors which results in the release of dopamine, serotonin, and norepinephrine in the brain. Symptoms of caffeine intoxication include anxiety, nervousness, restlessness, insomnia, gastrointestinal issues, tachycardia, and in rare cases, death [8].

Numerous studies have been published regarding the consumption of EDs among young people and adolescents. Most have been conducted in a university/college student setting or among young adults, with the prevalence of ED consumption ranging from 19.5% to 78.5%. Some studies have reported adverse events associated with ED consumption, including increased heartbeat, difficulty sleeping, and headache [9]. In Libya, very limited resources are available in regard to the consumption of EDs, especially among university students. One cross-sectional study found that consuming Eds is one of the key dietary habits among secondary school students, most of them under eighteen years old. One hundred and sixty-five students (34.38%) were drinking energy drinks, with 17.56% consuming ED daily, 29.70% consuming ED once per week, and 32.12% consuming ED once per month [10]. On the other hand, a cross-sectional survey of 225

students from three different medical colleges (medicine, pharmacy, and nursing) in Omar Al-Mokhtar University. About twenty-one percent of students (21.01%) were drinking energy drinks [11]. It is interesting, therefore, to understand whether these behaviors are similar among young adults in the western region of Libya. This study aimed to examine the knowledge level and consumption patterns of EDs among university students in Zawia, Libya. The consumer experience of ED consumption was also investigated.

Methods

Study design

A cross-sectional study was conducted during the academic year between October 2023 and January 2024. The sample size was calculated according to the sample size equation for a cross-sectional survey [12, 13] with a total number of 180 students from 3 colleges of the University of Zawia, based on the total number of students registered for the academic year 2023/2024.

Data Collection Tools

A self-administered questionnaire was used to collect the data. The questionnaire included four sections: a) demographic characteristics: age, gender, number of family members, family income, and the level of mother's education; b) medical history: It included questions about the medical history of the studied participants, such as sleeping disorders, severe thirst, or headaches etc. c) Food Habits: it included questions focused on the number of meals per day and the practice of energy drinks consumption d) Knowledge and beliefs: the questions in this section were focused on the participant's knowledge and beliefs about the composition and impact of energy drinks.

The validity of the questionnaire was verified by a pilot study in which 20 questionnaires were evaluated. Based on the comments, several questions from the final questionnaire were modified to improve clarity. These questionnaires were not processed in the final analysis. Questionnaires were distributed among students between regular class periods. Eligibility for this study was restricted to students in pharmacy, dentistry, or medical schools, excluding students from other schools and colleges within the same university.

Ethical Consideration

Before the initiation of the study, approval was obtained from the ethics committee of the faculty of medicine. Moreover, verbal consent was obtained from all participants.

Statistical analysis

were analyzed using descriptive and inferential statistical methods. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants' demographic characteristics, medical history, consumption habits, and knowledge about energy drinks. Inferential statistics were applied to identify significant associations and differences between variables. The Chi-square test was used to assess associations between categorical variables, such as energy drink consumption and demographic factors. For continuous variables, independent *t*-tests and one-way ANOVA were employed to compare knowledge and belief scores across age, gender, and college groups. Statistical significance was set at $p < .05$, and all analyses were conducted using SPSS V27.

Results

Demographic characteristics of participants

Participant characteristics are described in Table 1. The majority of participants (52.2%) were aged 22–24 years, with females comprising (77.8%) of the sample. Most participants came from larger families, with over (65%) having more than five family members. Regarding economic status, (53.3%) reported a monthly income level between 1000-3000 units, while (21.1%) earned less than 1000. Mothers' educational levels were predominantly primary or intermediate (72.8%), with only 1.1% holding advanced degrees. In terms of academic representation, (51.7%) of participants were from the Medicine College, followed by Pharmacy (26.1%) and Dentistry (22.2%). These findings highlight the socioeconomic diversity of the participants, which may influence energy drink consumption patterns.

Table 1. Frequency and percentage of demographic characteristics (N = 180).

Variables	Category	Count	%
Age	18	1	0.6
	19-21	85	47.2
	22-24	94	52.2
Gender	Male	40	22.2
	Female	140	77.8
Family member	≤ 3	16	8.9

	4	15	8.3
	5	31	17.2
	> 5	118	65.6
Monthly income level	< 1000	38	21.1
	1000-3000	96	53.3
	> 3000	46	25.6
Mother's educational level	Master or PhD	2	1.1
	Secondary or university	19	10.5
	Primary or intermediate	131	72.8
	Illiterate	28	15.6
Collage	Medicine	93	51.7
	Dentist	40	22.2
	Pharmacy	47	26.1

Medical history of participants

The medical history of participants is shown in table (2) indicating a range of health concerns. Sleep-related issues were common, with (15.0%) reporting consistent sleeping disorders or insomnia and 43.9% experiencing them occasionally. Severe thirst was less frequent, with 5.6% experiencing it regularly and (25.0%) sometimes. Headaches were reported consistently by (23.3%) of participants and occasionally by (42.2%). Heart palpitations were less prevalent, with (7.8%) experiencing them regularly and (17.2%) sometimes. Smoking was rare, as (95.6%) of participants were nonsmokers. Chronic conditions such as diabetes and hypertension were reported by only (2.2%) of participants each, and (3.9%) reported heart disease. These findings suggest that most participants did not report significant medical issues.

Table 2. Medical history of the participants:

Medical history	Category	Count	%
Sleeping disorders and insomnia	Yes	27	15.0
	Sometimes	79	43.9
	No	74	41.1
Suffer from severe thirst	Yes	10	5.6
	Sometimes	45	25.0
	No	125	69.4
Suffer from a headache	Yes	42	23.3
	Sometimes	76	42.2
	No	62	34.4
Suffer from heart palpitations	Yes	14	7.8
	Sometimes	31	17.2
	No	135	75.0
A smoker	Yes	3	1.7
	Sometimes	5	2.8
	No	172	95.6
Have diabetes	Yes	4	2.2
	No	176	97.8
Have hypertension	Yes	4	2.2
	No	176	97.8
Suffer from heart disease	Yes	7	3.9
	No	173	96.1

Food and Energy drinks consumption

Table (3) showed figures on dietary patterns and energy drink usage. Most participants (58.9%) reported consuming 3-4 meals per day, while (36.7%) consumed fewer than three meals. Energy drink consumption was about (12.2%) consuming them regularly and (30.0%) occasionally. Among consumers, (64.4%) reported drinking energy drinks fewer than three times per week, while (14.5%) drank them daily, with the majority (72.7%) consuming only one can per day. During exam periods, (19.4%) used energy drinks to enhance alertness, and (18.3%) did so occasionally. Only (10.6%) consumed energy drinks to overcome apathy and lethargy, and (10.0%) used them to improve athletic performance, often before exercise (62.1%). These results highlight a cautious and occasional use of energy drinks, with a notable preference for limiting consumption frequency and volume.

Table 3. Food and consumption of energy drinks habits:

Variables	Category	Count	%
How many meals do you take in a day?	> 4	8	4.4
	3-4	106	58.9
	< 3	66	36.7
Do you consume energy drinks?	Yes	22	12.2
	Sometimes	54	30.0
	No	104	57.8
If you drink it, how often do you drink it?	Daily	11	14.5
	3-6 in a week	16	21.1
	< 3 in a week	49	64.4
If daily, how many cans in a day?	1	8	72.7
	2	1	9.1
	> 2	2	18.2
Do you consume energy drinks in the exam period?	Yes	35	19.4
	Sometimes	33	18.3
	No	112	62.2
Do you consume energy drinks to overcome the apathy and lethargy?	Yes	19	10.6
	Sometimes	24	13.3
	No	137	76.1
Do you consume energy drinks to improve athletic performance?	Yes	18	10.0
	Sometimes	11	6.1
	No	151	83.9
If yes or sometimes, when	Before exercise	18	62.1
	During exercise	7	24.1
	After exercise	4	13.8

Knowledge and beliefs

The results on participants' knowledge and beliefs about energy drinks in table (4) indicate varying levels of awareness and perception. While (33.9%) of participants believed energy drinks increase concentration and (38.9%) thought they help with staying up late, a substantial proportion (36.7% and 33.3%, respectively) were unsure. A majority (88.3%) recognized that energy drinks contain caffeine, a statistically significant finding ($\chi^2 = 105.80$, $p < .001$). However, only (30.0%) were aware of the components of energy drinks ($\chi^2 = 28.800$, $p < .001$), and 32.2% believed they contain vitamins ($\chi^2 = 22.756$, $p < .001$). Furthermore, (77.2%) correctly identified that energy drinks differ from soft drinks, a significant result ($\chi^2 = 53.356$, $p < .001$). These findings suggest a general awareness of caffeine content but limited knowledge about other components and potential misconceptions regarding energy drinks' benefits and composition.

Table 4: Knowledge and beliefs of the participants about energy drinks

knowledge and believes	Category	Count	%	Chi square	P-value
Do you think that energy drinks increase the ability to concentrate?	Yes	61	33.9	1.433	0.488
	No	53	29.4		
	I don't know	66	36.7		
Do you think that energy drinks help to stay up late?	Yes	70	38.9	3.333	0.189
	No	50	27.8		
	I don't know	60	33.3		
Do you think that energy drinks contain caffeine?	Yes	159	88.3	105.80	< 0.001
	No	21	11.7		
Do you know what the components of energy drink are?	Yes	54	30.0	28.800	< 0.001
	No	126	70.0		
Do you think that energy drinks contain vitamins?	Yes	58	32.2	22.756	< 0.001
	No	122	67.8		
Do energy drinks differ from soft drinks?	Yes	139	77.2	53.356	< 0.001
	No	41	22.8		

Relationship of Energy Drink Consumption with Demographic, Academic, and Exam period of students

The association between energy drink consumption and demographic, academic, and exam-related variables in table (5) presents significant patterns. Gender was significantly associated with energy drink consumption ($\chi^2 = 16.563$, $p < .001$), with males showing higher rates of "sometimes" consumption (10.6%) compared to females (7.2%). College affiliation also showed a significant association ($\chi^2 = 11.302$, $p = .023$), with medical students reporting the highest consumption (9.4% regularly and 17.2% sometimes), followed by dentistry and pharmacy students. Exam periods were strongly associated with energy drink consumption ($\chi^2 = 108.826$, $p < .001$); 10.0% of participants consumed energy drinks during exams, and (7.2%) did so occasionally. However, no significant association was found between age and energy drink consumption ($\chi^2 = 2.011$, $p = .734$). These results suggest that gender, college affiliation, and exam periods are key factors influencing energy drink consumption, while age appears to play a less significant role.

Table 5: Relationship between EDs intake and the sociodemographic characteristics, academic, and exam period of students

Variables	Consumption of energy drinks						Chi square	P value
	Yes		Sometimes		No			
	Count	%	Count	%	Count	%		
Age								
18	0	0.0	0	0.0	1	0.6	2.011	0.734
19-21	8	4.4	26	14.4	51	28.3		
22-24	14	7.8	28	15.6	52	28.9		
Gender								
Male	9	5.0	19	10.6	12	6.7	16.563	< 0.001
Female	13	7.2	35	19.4	92	51.1		
Collage								
Medicine	17	9.4	31	17.2	45	25.0	11.302	0.023
Dentist	3	1.7	13	7.2	24	13.3		
Pharmacy	2	1.1	10	5.6	35	19.4		
Exam period								
Yes	18	10.0	13	7.2	4	2.2	108.826	< 0.001
Sometimes	1	0.6	23	12.8	9	5.0		
No	3	1.7	18	10.0	91	50.6		

Knowledge and Beliefs of Students Categories (Age, Gender, and College) towards Energy Drinks

The comparison of knowledge and beliefs about energy drinks across age, gender, and college categories revealed mixed results. No significant differences were found between age groups ($t = 1.109$, $p = .269$) or genders ($t = 1.496$, $p = .136$), suggesting that age and gender do not significantly influence participants' knowledge and beliefs. However, a significant difference was observed across colleges ($F = 5.008$, $p = .008$). Post-hoc comparisons using Tukey's HSD tests indicated that participants from the Medicine and Pharmacy colleges had higher mean scores (3.22 and 3.11, respectively) compared to those from the Dentistry college (2.40). These findings suggest that academic affiliation may play a role in shaping knowledge and beliefs about energy drinks, while age and gender have a lesser impact.

Knowledge about energy drink components was limited; although 88.3% recognized caffeine content, only 30.0% were aware of specific ingredients. Misconceptions, such as energy drinks improving concentration and containing vitamins, were prevalent. Despite low rates of chronic illnesses, participants reported headaches (23.3%) and sleep disturbances (15.0%) that may be linked to energy drink consumption.

Table 6: Knowledge and Beliefs of students Categories (Age, Gender, and College) towards Energy Drinks

Variable	Category	N	Mean	Std	Test value	P value
Age	18-21	86	3.13	1.387	T = 1.109	0.269
	22-24	94	2.89	1.440		
Gender	Male	40	3.30	1.418	T = 1.496	0.136
	Female	140	2.92	1.409		
Collage	Medicine	93	3.22 ^a	1.374	F = 5.008	0.008
	Dentist	40	2.40 ^b	1.336		
	Pharmacy	47	3.11 ^a	1.448		

Discussion

This study is the first of its kind to examine the prevalence of the EDs consumption among medical students at the University of Zawia, which demonstrated the beliefs, patterns, and knowledge of energy drinks consumption among them. The majority of participants (52.2%) were aged 22–24 years, with females comprising (77.8%) of the sample. Only about (12.2%) consume them regularly and (30.0%) occasionally. A number of similar studies have shown consistent results with those presented in this paper. Alabbad MH, et al reported a lower prevalence rate (15.14%) of ED consumption among the students of a Saudi University [14]. This percentage is comparable to a number of studies conducted in Omar Mokhtar, Turkish, and Zambian university students, where (21), (22.5%), and (27.4%) of students have been shown to consume EDs, respectively [11-15-16]. In addition, other studies from Saudi Arabia among medical student in two cities, reported a lower consumption rate (27.7%) of EDs consumption at Umm Al-Qura University in Makkah [17] as compared to high prevalence (74.8%) at Taif university as same as Jordan study have shown, (40.1%) of EDs consumptions [18, 19]. Likewise, 61.83% among medicine and dentistry students in Lublin [20].

The majority of the students (72.7%) in this study consume only one can per day, and the common reasons given by the respondents related to energy drinks were to enhance alertness, to overcome apathy and lethargy, and (10.0%) used them to improve athletic performance before exercise. These findings are compatible with a past study where the reasons for drinking energy drinks were to gain energy [10- 17]. In fact, in our study, the gender differences were observed in higher participation from female students. This higher rate of female participation reflects the predominance of females opting for careers related to medicine in Arab countries and explain the lower rate of EDs consumption by the fact that males are more interested in consuming more energy products to boost energy for athletic reasons on the other hand many studies reported a higher prevalence of EDs consumption among males compared with female [14,17]. In terms of academic representation, (51.7%) of participants were from the Medicine College, followed by Pharmacy (26.1%) and Dentistry (22.2%) , College affiliation also showed a significant association ($\chi^2 = 11.302$, $p = .023$), with medical students reporting the highest consumption (9.4% regularly and 17.2% sometimes), followed by dentistry and pharmacy students It could be explained by variation in the number of students registered in this academic year with in University Exam periods were strongly associated with energy drink consumption and the common reasons given by the respondents were to enhance alertness, to overcome apathy and lethargy, and These findings are consistent with a study reported same finding by Usman and colleagues in Pakistan [21]. Also, a study from Italy informed that the common reasons given by the respondents related to energy drinks were out of habit, studying, during exercise, and energy needs [22]. A survey conducted in Makkah reported that most users consumed energy drinks because they think that these drinks keep them awake for a longer time, and improving mental and physical activities were reported to trigger undergraduate students to consume energy drinks [23]. However, on the other hand, most students reported different adverse effects, such as Sleep-related issues were common, with (15.0%) reporting consistent sleeping disorders or insomnia and 43.9% experiencing them occasionally. Severe thirst was less frequent, with 5.6% experiencing it regularly and (25.0%) sometimes. Headaches were reported consistently by (23.3%) of participants and occasionally by (42.2%). Heart palpitations were less prevalent, with (7.8%) experiencing them regularly and (17.2%) sometimes. Many studies reported similar adverse effects of EDs, [19, 24]. Caffeine is the main active ingredient of the energy drinks; our findings revealed that (88.3%) of participants knew that the main component of these drinks is caffeine. In agreement with (Musaiger and Zagzoog, 2013) (53.8%) of students were known that these drinks contained caffeine ($p < 0.001$) and another study revealed that (63.48%) known the main component of these drinks is caffeine [25] , Regarding the knowledge about vitamins content in the energy drinks, (Musaiger and Zagzoog, 2013) and Elsoadaa (25) and there colleges revealed that more than half of participant were not known that vitamin are main component of EDs, that almost the same of our results where, (67.8%) of students were not known that energy drinks contain vitamins and A soft drink is a drink that typically contains carbonated water, sweeteners, and either natural or artificial flavors, (77.2%) correctly identified that energy drinks differ from soft drinks, a significant result ($\chi^2 = 53.356$, $p < .001$). This revealed a great improvement of awareness of the nature of energy drinks. In fact, (Musaiger and Zagzoog, 2013) mention that the majority of adolescents (67%) viewed energy drinks as soft drinks.

Limitations of the study

This study was a single institutional study, in Zawia University, which was subject to selection bias as the responses of the medical students cannot be generalized to the medical student population in other cities in Libya.

Conclusion

Energy drinks are gaining increasing popularity in recent years, necessitating closer monitoring of their use. This study determined that consumption of EDs is relatively higher among students at medical colleges than those in dentistry and pharmacy colleges. These observations suggest the need for increased governmental oversight of EDs, their targeted advertising campaigns, and their labeling practices. In addition, supporting further research in this area and working collaboratively with manufacturers to provide beverages with lower sugar content and fewer stimulants. Also, increase the awareness about side effects in all country sectors, even on social media.

References

1. Higgins JP, Liras GN, Liras IN. Some popular energy shots and their ingredients: are they safe and should they be used? A literature review. *Beverages*. 2018;4(1):20. doi:10.3390/beverages4010020.
2. Malinauskas BM, Aeby VG, Overton RF, Carpenter-Aeby T, Barber-Heidal K. A survey of energy drink consumption patterns among college students. *Nutr J*. 2007;6:35. doi:10.1186/1475-2891-6-35.
3. Heckman MA, Sherry K, De Mejia EG. Energy drinks: an assessment of their market size, consumer demographics, ingredient profile, functionality, and regulations in the United States. *Compr Rev Food Sci Food Saf*. 2010;9(3):303-17. doi:10.1111/j.1541-4337.2010.00111.x.
4. Elderbi M, Elburi A, Shailabi T. Energy Drinks Consumption Among Medical Student in Omar Al-Mukhtar University. *AlQalam Journal of Medical and Applied Sciences*. 2023 Jun 21:320-6.
5. Attipoe S, Leggit J, Deuster PA. Caffeine content in popular energy drinks and energy shots. *Mil Med*. 2016;181(9):1016-20. doi:10.7205/MILMED-D-15-00505.
6. Yunusa I, Ahmad IM. Energy-drinks: composition and health benefits. *Bayero J Pure Appl Sci*. 2011;4(2):186-91. doi:10.4314/bajopas.v4i2.38.
7. Romero JC, Reckelhoff JF. Role of angiotensin and oxidative stress in essential hypertension. *Hypertension*. 1999;34(4 Pt 2):943-9. doi:10.1161/01.HYP.34.4.943.
8. Sepkowitz KA. Energy drinks and caffeine-related adverse effects. *JAMA*. 2013;309(3):243-4. doi:10.1001/jama.2012.173526.
9. Hammond D, Reid JL, Zukowski S. Adverse effects of caffeinated energy drinks among youth and young adults in Canada: a Web-based survey. *CMAJ Open*. 2018;6(1):E19-25. doi:10.9778/cmajo.20160154.
10. Omar H, Omar A, Muhammed A, Elderbi M. Energy drinks consumption and awareness among secondary school students in Benghazi, Libya. *Alq J Med App Sci*. 2021;4(1):116-21. doi:10.5281/zenodo.4536178.
11. Elderbi M, Elburi A, Shailabi T. Energy drinks consumption among medical student in Omar Al-Mukhtar University. *Alq J Med App Sci*. 2023;6(2):320-6. doi:10.5281/zenodo.8063828.
12. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. *Gastroenterol Hepatol Bed Bench*. 2013;6(1):14-7.
13. Kasiulevičius V, Šapoka V, Filipavičiūtė R. Sample size calculation in epidemiological studies. *Gerontologija*. 2006;7(4):225-31.
14. Alabbad MH, AlMussalam MZ, AlMusalmi AM, et al. Determinants of energy drinks consumption among the students of a Saudi University. *J Family Community Med*. 2019;26(1):36-44. doi:10.4103/jfcm.JFCM_42_18.
15. Bulut B, Beyhun NE, Topbaş M, Çan G. Energy drink use in university students and associated factors. *J Community Health*. 2014;39(5):1004-11. doi:10.1007/s10900-014-9849-3.
16. Nowak D, Jasionowski A. Analysis of the consumption of caffeinated energy drinks among Polish adolescents. *Int J Environ Res Public Health*. 2015;12(7):7910-21. doi:10.3390/ijerph120707910.
17. Bawazeer NA, AlSobahi NA. Prevalence and side effects of energy drink consumption among medical students at Umm Al-Qura University, Saudi Arabia. *Int J Med Stud*. 2013;1(3):104-8.
18. Edrees AE, Altalhi TM, Al-Halabi SK, et al. Energy drink consumption among medical students of Taif University. *J Family Med Prim Care*. 2022;11(7):3950-5. doi:10.4103/jfmpc.jfmpc_1952_21.
19. Elsahoury NA, Alhaj OA, McGrattan AM, Hammad FJ. Energy drinks consumption, knowledge and self-reported effect among university students in Jordan: cross-sectional study. *Curr Nutr Food Sci*. 2021;17(6):639-50. doi:10.2174/1573401317666210216111925.
20. Cencek P, Wawryk-Gawda E, Samborski P, Jodlowska-Jedrych B. Energy drinks - consumption and awareness among students of Medical University of Lublin. *Curr Issues Pharm Med Sci*. 2016;29(4):190-4. doi:10.1515/cipms-2016-0040.
21. Usman A, Bhombal ST, Jawaaid A, Zaki S. Energy drinks consumption practices among medical students of a Private sector University of Karachi, Pakistan. *J Pak Med Assoc*. 2015;65(9):1005-7.
22. Global Energy drink report. 2012. Available from: <http://www.prnewswire.com/news-releases/global-energy-drinks-report-2012-183349051.html>.
23. Aslam HM, Mughal A, Edhi M, et al. Assessment of pattern for consumption and awareness regarding energy drinks among medical students. *Arch Public Health*. 2013;71(1):31. doi:10.1186/0778-7367-71-31.
24. Murad HA, Rafeeq MM. Pattern of use and awareness of contents benefits and adverse effects of energy drinks among university student in Rabigh, Saudi Arabia. *Biomed Res*. 2016;27(2):458-64.
25. Elsoadaa SS, Hejazi HH, Sonbul AA, et al. Prevalence of Energy Drinks Consumption among Adolescents. *J Health Med Nurs*. 2016;33:79-90.
26. Musaiger AO, Zagzoog N. Knowledge, attitudes and practices toward energy drinks among adolescents in Saudi Arabia. *Glob J Health Sci*. 2014;6(2):42-6. doi:10.5539/gjhs.v6n2p42.