

Awareness and Consumption Pattern of Energy Drinks Among Bahraini Youth

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Objective: To evaluate various factors affecting energy drink consumption among Bahraini youth (from the ages of 15 through 24 years old). Moreover, this study aimed to assess the participant's level of knowledge about the contents of energy drinks.

Design: A cross-sectional study

Setting: Kingdom of Bahrain

Methods: The cross-sectional study was conducted on a randomly selected sample of 728 individuals (301 males and 427 females) from the local Bahraini population. Data collection was conducted through a questionnaire via WhatsApp during the period of October 2017 to May 2018.

Results: Of the total youth sample, only 16% of respondents were energy drink consumers, 14% had previously consumed them, while the majority had never consumed energy drinks (70%). Reasons for not consuming or stopped consuming were that young energy drink consumers had prior knowledge about its harmful effects (38.2%), no particular reason (21.9%), or disliked its taste (17.0%), with the remaining reasons being trivial. The main reasons cited for consuming energy drinks were reducing fatigue (24.4%), maintaining alertness (20.8%), enhancing academic performance (11.8%), and for leisure purposes (11.3%). Consumers cited family and friend's recommendation (54.7%), commercial advertisements (15.4%) and aggressive marketing strategies (13.7%) as main sources for being introduced to energy drinks. Furthermore, taste (41.6%), price (18.0%), and brand popularity (10.1%) were reported to influence the choice of energy drinks among the young patrons. As for the main adverse effects of energy drink consumption, 13.0% of consumers reported no effects, while 11.6% experienced an increase in heart rate.

Conclusion: Overall, the prevalence of energy drink use among Bahraini youth consumers was low. Nevertheless, the results highlight the need for rigorous education regarding use of energy drinks and its probable negative effects on adolescents and young adults.

INTRODUCTION

Energy drinks are non-alcoholic beverages containing high amounts of caffeine, taurine, glucuronolactone, vitamins, and sugar/sweeteners, which vary depending on brand and type¹. In addition, other stimulants like inositol, guarana extract, ginseng, *Ginkgo biloba* or carnitine may be found in energy drinks². Since its introduction in the Asian markets in the 1960s, energy drinks, which were marketed as energy enhancers, have expanded rapidly in the US market and beyond^{3,4}. Energy drink marketing strategies focuses on the concept of performance enhancement, energy boosting capabilities, sport esteem, mental alertness and metabolic efficiency⁵.

Several studies have documented on the adverse effects of energy drink usage like anxiety, mood swings, headache, dehydration, gastroesophageal reflux, mild diarrhea or constipation, vomiting, cardiac dysrhythmia, mood and behavioral problems and in females menstrual irregularities, post-menopausal vaginal bleeding and breast enlargement⁶⁻⁹. Moreover, consumption of these drinks is reportedly associated with the development of non-communicable diseases (NCDs) such as obesity, the metabolic syndrome, and type 2 diabetes¹⁰.

Adolescents and young adults have been targeted by energy drink manufacturers with such products being perceived to deliver a combination of stimulants and energy boosters, and enhancement alertness¹¹. Energy drinks are readily accessible as they are distributed in convenience stores, supermarkets and other outlets¹². Furthermore, vigorous marketing of energy drinks has relied on the use of nontraditional outlets such as extreme sports, product placement in video games and social media, and celebrity endorsements, which resulted in increased popularity among young consumers¹³. In fact, energy drink consumption among young adults is increasingly common, whereby more than one-half of the global consumer market consists of adolescents and young adults under the age of 35 years¹⁴.

Taxation of sugar-sweetened beverages has emerged as a cost-effective strategy to improve public health by reducing consumption of sugary drinks and, subsequently, reduce the risk of obesity and related metabolic derangements¹⁵. In 2015, the six countries of the Gulf Cooperation Council (GCC) passed a law introducing a tax that increased the price of energy drinks by 100%. Bahrain implemented this excise tax in December 2017, which represented a major step in promoting public health awareness¹⁶. This could potentially have a

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positive impact on enhancing knowledge, encouraging better lifestyle choices, and reducing non-communicable diseases. Implemented excise tax policy on sugar-sweetened beverages like energy drinks can reveal consumer nutritional knowledge of its health side effects, label contents and manufacturer beneficial claims.¹⁵

In Bahrain, there is not much data available regarding the awareness, prevalence and side effects of consuming energy drinks. Therefore, this study aimed to assess the awareness of young Bahrainis about the potential hazards of energy drink, and evaluate the factors affecting energy drink consumption along with their level of knowledge regarding the contents of energy drinks.

METHODS

Study Design: A cross-sectional research methodology with a descriptive research design was used for this study. Data were collected through online distribution of a carefully designed self-administered semi-structured questionnaire, with the view of obtaining a large sample of respondents.

Sample: The sample size was drawn randomly from Bahraini youth between the ages of 15 to 24 years. If the proportion (P) of a target population with certain characteristics is 0.5, the Z-statistics is 1.96 and desire accuracy (E) is 0.05, then the calculated sample size should be 384 by using the following formula $n = (Z)^2 P (1 - P) / (E)^2$ in order to achieve the desired level of accuracy¹⁷. A total of 728 subjects (301 males and 427 females), representing almost two-fold the minimum sample size needed to assure adequate statistical results, were enrolled in the study.

Questionnaire: A semi-structured questionnaire was developed. The 17-item questionnaire was initially formulated in English and subsequently translated into Arabic, the native language of the target population. The questionnaire was distributed in both English and Arabic and included a full range of response options organized into three sections. The first section of the questionnaire (8 questions) collected demographic information. The second section (6 questions) consists of reasons for consuming or not consuming energy drinks among the study participant, first time knowledge about energy drinks, factors affecting the choice and type of energy drink consumed and the most common adverse effects as reported by energy drink consumers. Finally, the third part (3 questions) of the questionnaire is related to the safety of consuming energy drinks and the main ingredient contents of the consumed energy drinks among the study participant. A preliminary off-record pilot study of the above designed questionnaire was conducted on a sample of 20 random Bahraini youth ages between 15 to 24 years old. This was essential to assess the consistency, simplicity and clarity of the questions.

Questionnaire Distribution: The data was collected online between October 2017 and May 2018 using Google Forms. The survey was distributed through social media platforms like Facebook, Instagram, WhatsApp and Twitter. The targeted respondents were Bahraini youth who were in middle to high school education (governmental intermediate and high schools) and those who were in tertiary education or had completed tertiary education.

Ethical Consideration: Approval was obtained from the Ethics committee of the Department of Biology, University of Bahrain and the Scientific Research Directorate of the Higher Educational Council, Ministry of Education, Kingdom of Bahrain. The study was conducted according to the guidelines of the Declaration of Helsinki and written informed consent was obtained from all participants.

Statistical Analysis: The data were analyzed using SPSS version 24 (IBM, Armonk, NY, USA). Descriptive statistics were performed on all data including the frequencies and percentages of different variables mean and standard deviation (SD). Multiple response variables (MRV) in the questionnaire required a special attention during the analysis. The procedure of MRV was applied only to multiple choice answers. The percentages (%) were computed from the MRV.

RESULTS

A total of 728 respondents participated in the study, with females (n=427; 58.7%) outnumbering males (n=301; 41.3%). Table 1 shows the demographic characteristics of the young respondents. A large number of respondents were between 15 and 18 years (48.6%) and most of them were single. Most of the respondents (86.7%) were non-smokers with nearly half (43.1%) not engaging in exercise and physical activity, while the other half reported engaging in regular exercise during the week. Moreover, more than 67.9% respondents were school students and 18.3% were employees. According to residence distribution of the respondents, 32.7% were residing in the Northern governorate, 27.2% in Muharraq governorate, 23.5% in the Southern governorate, and 16.6% in the Capital governorate.

Table 1: Demographic characteristics of the study population (n=728)

Demographic Variable Category	Number	(%)	
Gender	Female	427	58.7
	Male	301	41.3
Marital status	Single	518	71.2
	Married	204	28.0
	Widowed	3	0.4
Age	Divorced	3	0.4
	15 - 18 years	354	48.6
	19 - 21 years	116	15.9
Education level	22 - 24 years	258	35.4
	Primary	4	0.5
	Intermediate	24	3.3
Occupation	Secondary	404	55.5
	University	296	40.7
	Student	494	67.9
Physical Activity	Employed	133	18.3
	Unemployed	46	6.3
	Housewife	55	7.6
Smoking	No activity	314	43.1
	Exercising 2-3 times/week	262	36.0
	Exercising 4-5 times/week	88	12.1
Residence Area	Exercising 6-7 times/week	64	8.8
	Yes	97	13.3
	No	631	86.7
Residence Area	Muharraq governorate	198	27.2
	Capital governorate	121	16.6
	Northern governorate	238	32.7
	Southern governorate	171	23.5

Respondents were asked about their current status relating to energy drink consumption (Figure 1). Accordingly, 16% of the respondents were identified as being energy drink consumers (n=117), 14% had previously consumed energy drinks but no longer consumed such products (n=101), while the majority (70%) had never consumed energy drinks (n=510). The

main reasons cited for not consuming or had stopped consuming energy drinks were having prior knowledge about its harmful effects (38.2%) and disliking its taste (17.0%), while more than one-fifth (21.9%) of the respondents gave no particular reason (Table 2).

Table 2: Outlined rationale for not consuming energy drinks among the study population (n=589)

Characteristics	Number	(%)
Expense	26	4.41
May cause addiction	22	3.74
Dislike the taste	100	17.0
Could be harmful	225	38.2
No definite reason	129	21.9
May cause obesity	45	7.64
Others	42	7.13

Of those who consumed energy drinks, 24.4% reported it helped them reduce fatigue. Also, 20.8% reported it helped them stay awake, 11.8% indicated it enhances academic performance, and 11.3% reported it makes them feel better (Figure 1, 2). When asked how they first came to know about energy drinks, over half of the participants (54.7%) cited family and friends as a source of information (n=64), followed by television advertisements (n=18; 15.4%), and sponsored marketing events accounted for 13.7% (n=16) (Figure 3).

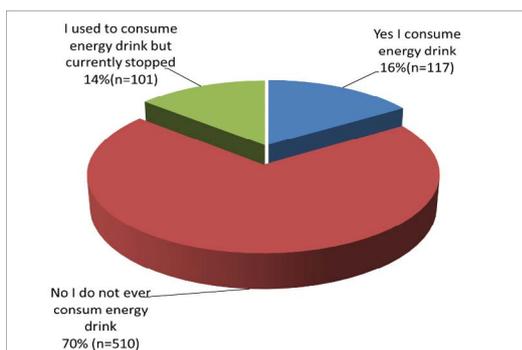


Figure 1: Category of respondents consumption of energy drinks (%).

The most common factors that influenced the choice of energy drinks among those participants consuming them regularly were taste (n=74; 41.6%), price (n=32; 18.0%) and brand reputation and popularity (n=18; 10.1%) (Figure 4).

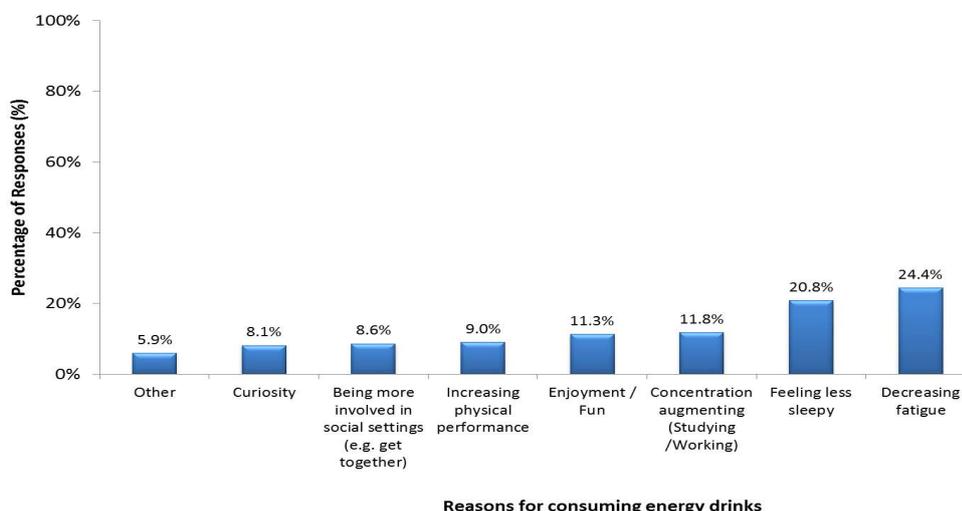


Figure 2: Outlined reasons for consuming energy drinks among the study population

Among those consuming such products the most common adverse effects were increased heart rate (11.6%) and fatigue (8.3%), with 13% of respondents not experiencing any symptoms of adverse effects (Table 3).

Table 3 The most common adverse effects cited by energy drink consumers (n=447)

Characteristics	Number	(%)
No adverse effect reported	58	13.0
Tachycardia	52	11.6
Fatigue	37	8.3
Insomnia	33	7.4
Dental caries	33	7.4
Headache	30	6.7
Inability to focus	28	6.3
Dehydration	27	6.0
Hypertension	26	5.8
Vomiting, nausea and abdominal pain	26	5.8
Weight gain	26	5.8
I don't know	25	5.6
Tremors	24	5.4
Muscle stiffness and aches	22	4.9

Out of 728 participants, majority (62%) responded that they did not read the ingredients of energy drinks, while 276 participants reported that they did read the nutritional ingredients label. In order to determine the participants' knowledge regarding energy drinks ingredients, they were asked about the main content of energy drinks. About one-third (31.7%; n=231) of the respondents answered caffeine correctly, whereas (24.2%; n=176) and (3.9%; n=28) had incorrectly answered sugar and taurine-nicotine, respectively. Less than half (40.2%; n=293) did not know the main content of energy drinks. Moreover, the study examined the participants' knowledge regarding the safety of energy drinks they consumed. More than half of the respondents (64.0%) oppose that consuming energy drinks were safe, 18.1% were neutral, and 12.8% did not know whether energy drinks were safe or not. Only 5.1% of the participants agreed with the assertion that energy drinks were safe. It is interesting that less than half of the respondents (46%, n=338) indicated that they had searched or read about energy drinks from social media (48.3%), followed by newspapers (17.5%) and specialists (16.4%) as their main sources of information (Figure 5).

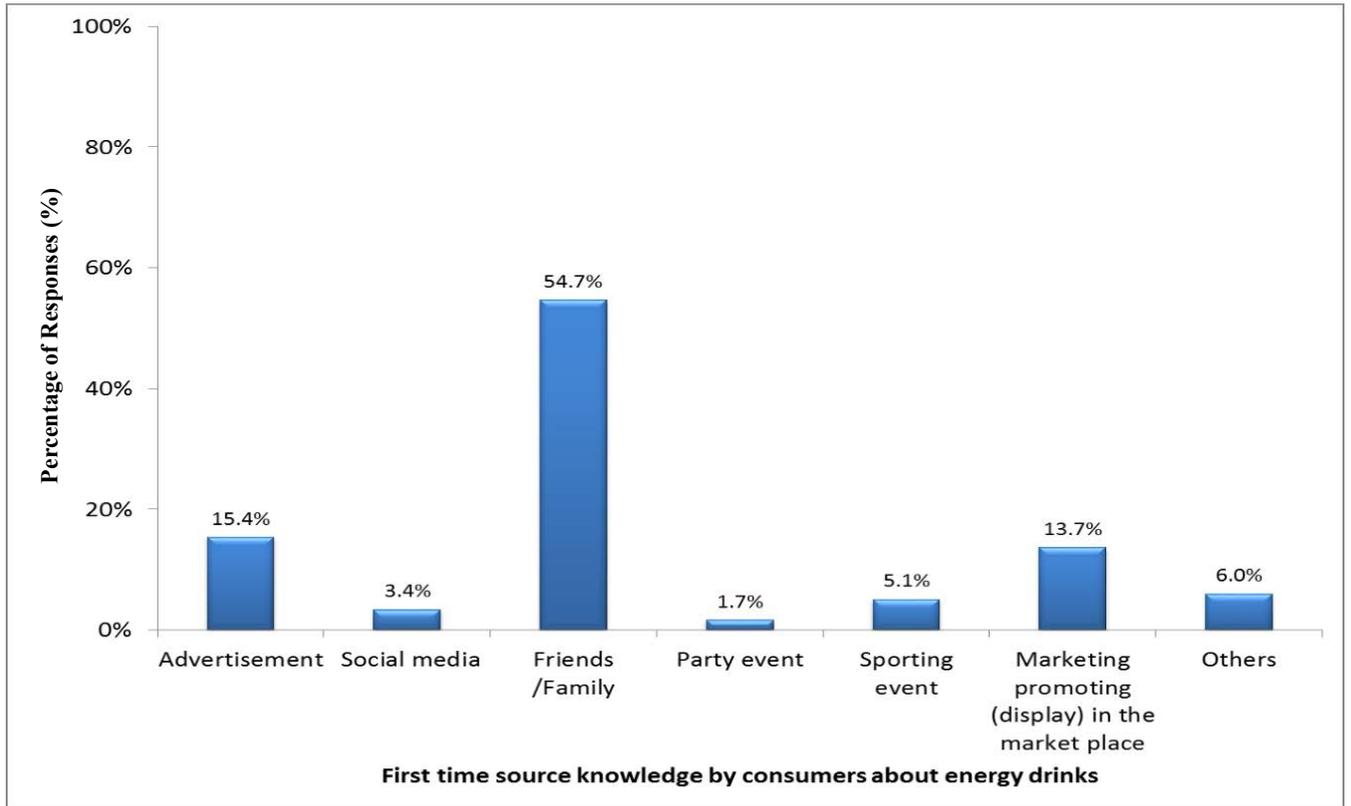


Figure 3: First time source knowledge by study respondents about energy drinks

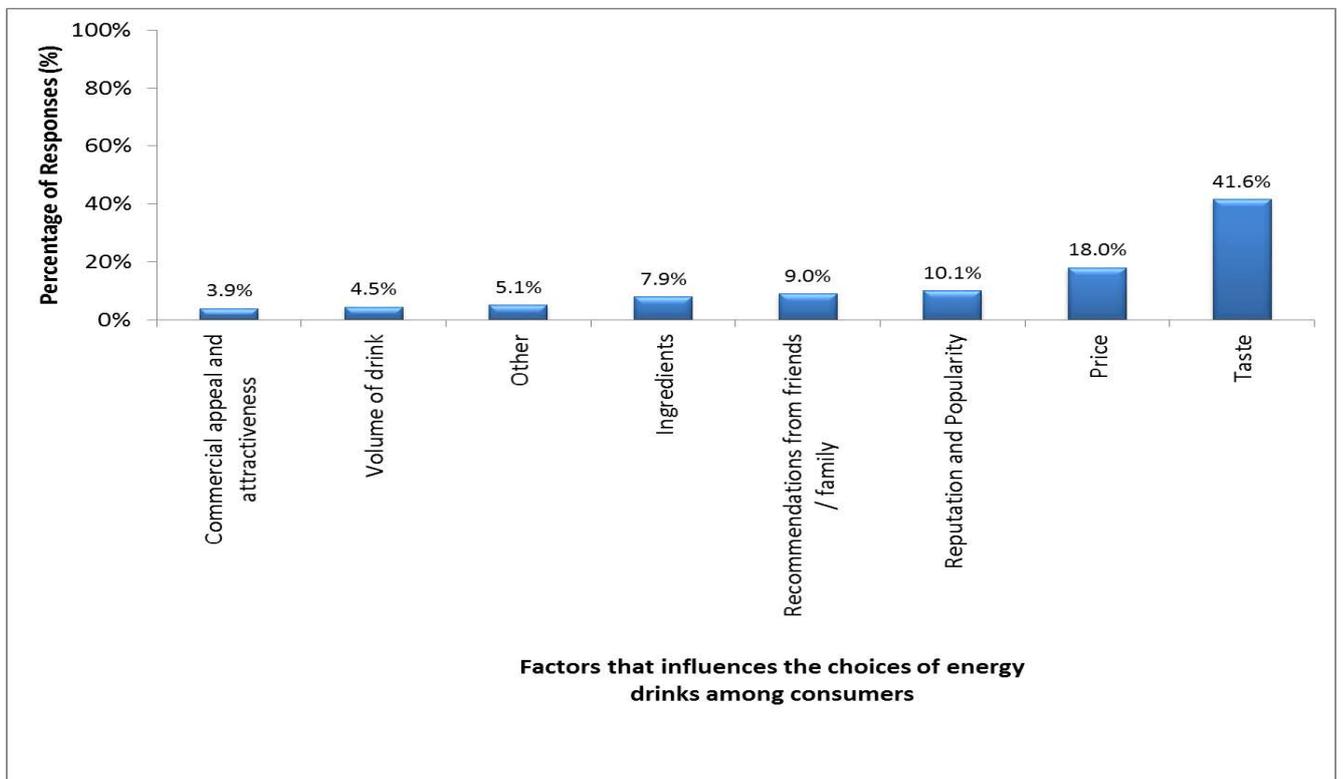


Figure 4: Factors that influence the choices of energy drinks consumed among consumers

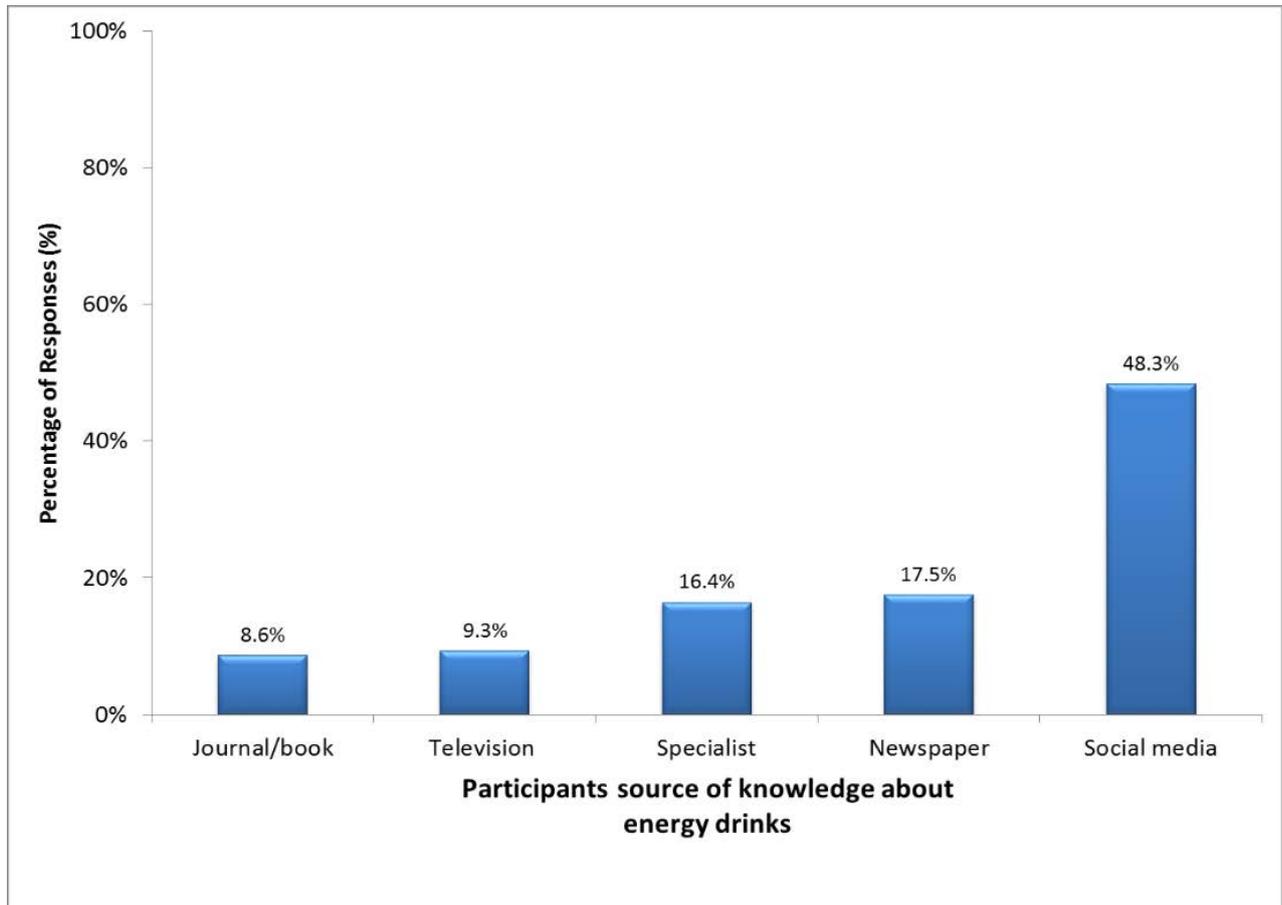


Figure 5: Participants responses regarding source of knowledge about energy drinks (multiple answers were allowed)

Energy Drinks Survey

University of Bahrain, College of Science

Department of Biology

Awareness and Consumption Pattern of Energy Drinks among Bahraini Youth

(Questioner)

* **Section One**

1. Gender	<input type="radio"/> Male		<input type="radio"/> Female	
2. Marital status	<input type="radio"/> Single	<input type="radio"/> Married	<input type="radio"/> Widow	<input type="radio"/> Divorce
3. Age group	<input type="radio"/> 15 -18	<input type="radio"/> 19-21	<input type="radio"/> 22-24	
4. Level of educational	<input type="radio"/> Primary	<input type="radio"/> Intermediate	<input type="radio"/> Secondary	<input type="radio"/> Diploma /University
5. Job/Career	<input type="radio"/> Student	<input type="radio"/> Employee	<input type="radio"/> Nonemployee	<input type="radio"/> Housewife
	Please specify :			
6. Physical Activity Status :	<input type="radio"/> No sporting activity	<input type="radio"/> Exercising 2-3 times per week	<input type="radio"/> Exercising 4-5 times per week.	<input type="radio"/> Exercising 6-7 times per week
7. Do you currently smoke?	<input type="radio"/> Yes		<input type="radio"/> No	
8. Residence Area	<input type="radio"/> Muharraq governorate	<input type="radio"/> Capital governorate	<input type="radio"/> Northern governorate	<input type="radio"/> Southern governorate

*** Section Two**

1. Do you currently, consume energy drinks?	<input type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> I used to consume energy drink but currently stopped.		
	<input type="radio"/> Expensive	<input type="radio"/> May cause addiction	<input type="radio"/> Do not like the taste	<input type="radio"/> I heard/read it is harmful	
2. If No, or stopped why? (choose the main reasons)	<input type="radio"/> No definite reason	<input type="radio"/> May cause obesity due to their high energy conten	<input type="radio"/> Other Please specify : _____		
<input type="checkbox"/> If you consume energy drinks, please answer all the following questions.					
3. What are your reasons for consuming energy drinks? (you can choose more than one answer)	<input type="radio"/> Increasing physical performance	<input type="radio"/> Feeling less sleepy	<input type="radio"/> Concentration augmenting (Studying / Working)	<input type="radio"/> Being more involved in social settings (e.g. get together)	
	<input type="radio"/> Decreasing fatigue	<input type="radio"/> Enjoyment / Fun	<input type="radio"/> Curiosity		
	<input type="radio"/> Other Please specify : _____				
4. How you did first came to know about energy drinks?	<input type="radio"/> Through advertisement	<input type="radio"/> Through social media	<input type="radio"/> Through friends / family		
	<input type="radio"/> During a party event	<input type="radio"/> During a sporting event	<input type="radio"/> During a marketing promoting (display) in the market place	<input type="radio"/> Others Please specify _____	
5. Which of the following factors influences your choice of energy drinks? (you can choose more than one answer)	<input type="radio"/> Price	<input type="radio"/> Commercial appeal and attractiveness	<input type="radio"/> Recommendations From friends / family	<input type="radio"/> Reputation and Popularity	
	<input type="radio"/> Volume of drink	<input type="radio"/> Ingredients	<input type="radio"/> Taste	<input type="radio"/> Others Please specify: _____	
6. What is the most common adverse effect of energy drinks you experience? (multiple choice)	<input type="radio"/> Fatigue	<input type="radio"/> Dehydration	<input type="radio"/> Increase heart rate	<input type="radio"/> Increase blood pressure	<input type="radio"/> Tremors
	<input type="radio"/> Muscle stiffness and aches	<input type="radio"/> Vomiting ,nausea and abdominal pain	<input type="radio"/> Insomnia	<input type="radio"/> Inability to focus	<input type="radio"/> Weight gain
	<input type="radio"/> Headache	<input type="radio"/> Dental caries	<input type="radio"/> No adverse or with drawl effect come ,according to my experience, they are just rumors		

*** Section Three**

1. Do you read the ingredient contents of the energy drinks?	<input type="radio"/> Yes	<input type="radio"/> No			
2. What is the main ingredient content of the energy drinks?	<input type="radio"/> Sugar	<input type="radio"/> Caffeine	<input type="radio"/> Taurine	<input type="radio"/> Nicotine	
	<input type="radio"/> I Don't know				
3. Do you agree that Energy drinks are safe?	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> I don't know	

DISCUSSION

This research contributes significantly to the limited data regarding the consumption of energy drinks among Bahraini youth. Over 700 people responded to our online survey, which was announced via social media platforms. The findings in this study revealed that the majority of Bahraini adolescents and young youth either did not (70%) or had stopped consuming energy drinks (14%). This is in contrast to other previous studies on consumption of energy drinks by adolescents and college students from different countries¹⁸⁻²². Nevertheless, the percentage of respondents who consumed energy drinks (16%) may possibly increase gradually in the future. This is evident by the fact that neighboring Saudi Arabia is ranked among the top ten countries globally in terms of energy drink consumption⁵.

In this study, 38.2% of the respondents identified the harmful effects of energy drinks as the main reason for not consuming or stopping energy drink consumption. Similarly, Murad and Rafeeq²³ reported that 82% of college students from Rabigh, Saudi Arabia considered energy drinks harmful. Another study reported that over half (53%) of Saudi adolescents and young adults from the northern region of Hail believed energy drinks as being unhealthy⁵.

Several studies have shown a positive correlation between the level of nutrition knowledge and the consumption of energy drinks²⁴⁻²⁶. In our study, almost half (49.6%) the participants who never consumed or stopped consuming energy drinks were aware of its potential harmfulness to human health. This is encouraging considering the fact that youth and adolescents are constantly exposed to advertisements depicting energy drinks as products that increase energy and enhance mental alertness and physical activity²⁷. Nevertheless, the findings in this study showed that the common reasons given by respondents who consumed energy drinks was to reduce fatigue (24.4%), maintain alertness (20.8%), and enhance academic performance (11.8%). Similarly, Subaiea and coworkers, found that most consumers of energy drinks in Saudi Arabia consumed these products for their effects on fatigue reduction and increased alertness and focus²⁸. Bulut et al.⁷ also reported enhancement of physical performance, overcoming fatigue and waking up as being the most common reasons for consuming energy drinks among university students in Turkey.

In this current study, the main reason for consumption of energy drinks is taste (41.6%). Cruz-Muñoz et al.²⁹ also reported similar percentage (38.9) of the school children from Barcelona, Spain giving taste as the reason behind consuming energy drinks. Similarly, a study by Faris

et al.³⁰ reported taste as being the topmost reason for energy drink consumption among Saudi adolescents.

More than half of the consumer participants (54.7%) stated that their first consumption was based on recommendations from friends or family, while 18.3% were attracted to them through advertising. This is in line with previous studies that reported participants first consuming energy drinks in a social setting accompanied by friends or family members³¹. These findings suggest that implementing a family guidance on approaching nutrition information and other effective intervention programs is important to increase the awareness about such drinks and their effects on health.

In our study, 13% of respondents did not experience any adverse effect when consuming energy drinks. This is interesting as it has been suggested that younger-aged participants who did not manifest any negative or harmful effects were either unaware or just ignoring the possible risks³¹. Among those who consumed energy drinks, 11% experienced an increased heart rate. Other common side effects reported in our study were fatigue, insomnia, headache, dehydration and high blood pressure. Many of these adverse effects that affect mainly the neurological and cardiovascular systems are related to excessive caffeine consumption³¹.

Based on the findings of our study, the majority (62%) of respondents never read the ingredients label. Similarly, Faris³ reported adolescents having consumed energy drinks for their perceived physiologic benefits, without knowing the ingredients or related health risks. Musaiger and Zagzoog³² also reported the lack of knowledge among Saudi adolescents on the active ingredients in energy drinks, with half of them not knowing that energy drinks contained caffeine. In contrary, the current study revealed that a large number of respondents correctly identified caffeine as the main component of energy drinks. Nevertheless, it is imperative to develop effective school-based intervention programs that focus on increasing knowledge about the nutrient composition of energy drinks and how to read food labels and then to interpret it for adolescents and young adults. This, in turn, will encourage them to consider healthier choices and to interpret false nutritional and health claims.

With regard to source of information, social media was reported as the major source of information on energy drinks by nearly half of the participants (48.3%). This is in contrast with the results of Emond et al.³³ who reported that advertisements over television being the most popular source of information concerning energy drinks. Aljaloud³⁴ also reported less than 10% of Saudi university students receiving their information from online sources. Nonetheless, the findings of this study clearly suggest that social media could be a promising feature for designing effective nutrition interventions for adolescents and young adults.

The main limitation of the present study is the design being cross-sectional and all data are respondent self-reported, which can be affected by recall bias and reporting errors. Another limitation is that the self-reported side effects could not be confirmed due to the lack of collected data related to the participant's medical history.

CONCLUSION

From the study findings, it can be concluded that energy drink consumption is relatively low among Bahraini youth. Our current data are also consistent with reports that show a lack knowledge regarding the ingredients of energy drinks among the surveyed youth. Consequently, a comprehensive health education intervention program is needed to increase the awareness about the nutrient composition and their harmful effects on health. In

addition, legislation on nutrition labelling is required to promote public health efforts to reduce NCDs and to regulate the use of such beverages by adolescents and young youth.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflict of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 19 January 2021

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