

A Survey of Energy Drink Consumption Among Medical Students In The Faculty Of Medicine King Fahad Medical City, Saudi Arabia.

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Abstract

Background: This study examined patterns of energy drink consumption, reasons for consumption, side effects and their correlations among medical students.

Methods: Cross-sectional, self-reported survey data were collected from 214 medical students at the Faculty of Medicine, King Fahad Medical City in Riyadh, Saudi Arabia. Data collected included demographics, usage pattern, types and frequency of energy drink consumption, as well as those of other caffeine containing drinks, and associated factors. Data were entered and analyzed using SPSS program VERSION 17.

Results: Approximately 71% of students consumed energy drinks, and consumption was significantly higher among male students with higher pocket money and in students who consumed more soft drinks. Red Bull was the preferred brand for the students, representing 76% of the total consumption. The most important reasons for energy drink use included studying, sleepiness or social gatherings. Males used energy drinks significantly more often than females. The maximum drink consumption was associated with treating the residual effects of the energy drinks and the minimum levels of consumption were associated with driving long distances. The majority of students did not report any side effects associated with the use of energy drinks. Headache and palpitations were the most important side effects encountered.

Conclusion: The consumption of energy drinks is widely prevalent among medical students, particularly males. Energy drinks were mostly consumed for studying and when needing extra energy for a long car drive and travel.

Keywords: Energy drinks, Medical students. Consumption, Riyadh, Sa

Introduction

Energy drink consumption is becoming increasingly popular among young people in the Kingdom of Saudi Arabia (KSA) and worldwide. More than 500 new energy drinks have been launched worldwide, yielding financial rewards of 5.7 billion dollars to the energy drink industry. [1]

Energy drinks contain many substances chosen to provide consumers with a sense of having extra energy. The primary component of these drinks is caffeine. There is no known human requirement for caffeine, and its consumption is associated with multisystem side effects.[1-7]

Unfortunately, advertising strategies for energy drinks have consistently emphasized extreme or high-risk activities and

have succeeded in encouraging many young people to increase their consumption of these drinks.[8, 9] Energy drink consumption patterns and their associated factors have been studied in many communities, although mostly in Western countries and in only a few Arab and Muslim countries.[10-15]

These studies found that energy drink consumption is a popular practice among college students, particularly those who get insufficient sleep or who need more energy in general, especially while studying for exams, working on major course projects and driving an automobile for prolonged periods of time.[10-15]

Energy drink consumption and academic performance are negatively correlated in some studies, whereas others claim that caffeine consumption does not affect the academic performance of college students.[16, 17]

There is growing empirical support for a link between energy drink consumption, particularly in large quantities, and negative health consequences.[18-20]

Many countries have set regulations, such as health warning labels, and some countries have banned energy drinks.[6, 10, 21]

Surveying the consumption of energy drinks and associated factors in the young people targeted by advertising will be helpful in developing intervention strategies.

Objectives/Purpose of the study :

This study aims to study the prevalence and patterns of energy drink consumption in medical students and the associated health factors.

Methods

This cross-sectional study targeted all medical students in the Faculty of Medicine (FOM), King Saudi Bin Abdulaziz University for Health Sciences (KSAU_HS). King Fahad Medical City (KFMC), Riyadh. A self-administered, anonymous, closed-ended questionnaire was drafted by the investigators after reviewing the relevant published literature. The questionnaire was pilot tested on males and

females and amended according to the results of the pilot study. Face validity was checked by four experts in the field of community medicine, nutrition, pharmacology and biostatistics. The internal consistency was evaluated using the Cronbach's alpha coefficient, which was 0.89. The questionnaire included demographics, usage patterns, types and frequency of energy drink consumption (as well as the types and frequency for other caffeine-containing drinks), reasons for use, side effects and associated factors. The questionnaire was approved by The Institutional Review Board (IRB) of King Fahad Medical City as it conformed to the principles embodied in the "Declaration of Helsinki" [22].

Statistical analysis:

Collected data were entered and analyzed using the SPSS software version 17. Categorical variables were assessed as counts and proportions. The mean score +/- the standard deviation (SD) was calculated for each quantitative variable along with the median, upper and lower interquartiles. Relationships between categorical variables were tested using the Chi square test.

Analysis of variance and the unpaired t-test were applied to compare the mean energy drink consumption according to the background variables. Logistic regression analysis was used to identify the significant predictors of energy drink consumption among the students. The level of significance was set to < 0.05 throughout the study

Results

The response rate was 91% (214 out of 235). Table 1 profiles the demographic characteristics of the students and their use of energy drinks. The majority of students were males,

aged 21 years and in their fourth year of college, and they had a pocket income of approximately 25-50 riyals per day. Approximately 71% of students consumed energy drinks, and males were significantly more likely to consume them than females (76.6% for males and 23.4% for females, $P < 0.005$); levels of consumption were also significantly higher among students with more pocket money ($P < 0.020$).

Table 2 shows the energy drink consumption compared to that of tea, coffee, soft drinks and analgesics (Panadol, Fevadol, and Adol, all different brand names for PARACETAMOL). Only students who consumed more soft drinks were significantly more likely to consume energy drinks ($P < 0.001$).

Table 3 shows that Red Bull is the preferred brand for students, and it was chosen by approximately 76% of students. The most important reasons for energy drink use included studying, sleepiness and social gatherings, and males used energy drinks significantly more frequently than did females when they needed more energy, as well as for driving ($P < 0.001$), which is shown in Table 4. The highest levels of consumption per day were reported to be for studying and treating the residual effects of the drinks, and the lowest levels of consumption were for driving long distances, as shown in Table 5.

Approximately 36%, 14% and 13% of students either did not experience any side effects, reported headaches or reported palpitations, respectively. The rest of the group (37%) reported a variety of complaints attributed to the side effects of energy drinks. There was no significant association between the reported side effects and the background variables examined in this study.

Table 1. Energy consumption use according to the demographic characteristics of the students*

Characteristic n (%)	Consumption of energy drinks		P value
	Yes n (%) 151 (70.6%)	No n (%) 63 (29.4%)	
Gender Male: 145 (67.8) Female: 69 (2.2)	111 (76.6) 40 (58.0)	34 (23.4) 29 (42.0)	0.005
Age in years 20: 17 (7.9) 21: 64 (29.9) 22: 45 (21.0) 23: 51 (23.8) 24+: 37 (17.1)	11 (64.7) 40 (62.5) 34 (75.6) 34 (66.7) 32 (86.5)	6 (35.3) 24 (37.5) 11 (34.4) 17 (33.3) 35 (13.5)	0.103
Class Third: 29 (13.6) Fourth: 99 (46.3) Fifth: 70 (32.7) Sixth: 16 (7.5)	20 (69.0) 66 (66.7) 52 (74.3) 13 (81.2)	9 (31.0) 33 (33.3) 18 (25.7) 3 (18.8)	0.551
Pocket money (Riyals) < 25: 31 (18.7) 25-50: 72 (43.4) 51-100: 50 (30.1) > 100: 13 (7.8)	20 (69.0) 66 (66.7) 52 (74.3) 13 (81.2)	9 (31.0) 33 (33.7) 18 (25.7) 3 (18.8)	0.02

* Numbers may not add to the total 214 due to missing data in some variables.

Table 2. Consumption of tea, coffee, soft drinks and analgesics according to energy drink use.*

Energy drinks Item consumed	Yes n (%)	No n (%)*	OR (95%CI)*	P value
Tea				
Yes 155 (74.9)	112 (72.3)	43 (27.7)	1.16 (0.58-2.30)	0.400
No 31 (25.1)	36 (69.2)	16 (30.1)		
Coffee				
Yes 175 (85.0)	127 (72.6))	48 (27.4)	1.26 (0.55-2.87)	0.362
No 31 (15.0)	21 (67.7)	10 (32.3)		
Soft drink				
Yes 166 (82.6)	129 (77.7)	37 (22.3)	3.69 (1.73-7.87)	0.001
No 35 (17.4)	17 (48.6)	18 (51.4)		
Use of Panadol				
Yes 153 (75.0)	111 (72.5)	42 (27.5)	1.10 (0.55-2.22)	0.459
No 51 (25.0)	36 (70.6)	15 (29.4)		
Use of Fevadol				
Yes 52 (26.0)	38 (73.1)	14 (26.9)	1.04 (0.51-2.12)	0.534
No 148 (74.0)	107 (72.3)	42 (27.7)		
Use of Adol				
Yes 33 (17.6)	26 (78.8)	7 (21.2)	1.35 (0.54-3.34)	0.342
No 154 (82.4%)	113 (73.4)	41 (26.6)		

OR (95%CI)* = Odds Ratio (95% Confidence Interval)

*Numbers may not add to the total 214 due to missing data in some variables.

Table 3. Types of energy drinks consumed

Type	Number *	Percentage *
Red Bull	114	75.5
Bison	75	49.7
Power Horse	65	43.1
Code Red	29	19.2
Others	11	7.3

* One student can consume more than one type.

Table 4. Reasons for consuming power drinks according to the gender of the students

Reason N (%)	Males N (%)*	Females N (%) *	P value
For study 52 (36.4)	36 (34.6)	16 (41.0)	0.302
Need more energy 45 (31.5)	24 (23.1)	21 (53.8)	< 0.001
Sleep disturbances 37 (25.9)	31 (29.8)	6 (15.4)	0.058
Social gatherings 36 (25.2)	25 (24.0)	11 (28.2)	0.378
Long car driving 34 (23.8)	32 (30.8)	2 (5.1)	<0.001
Long travel time 19 (13.3)	17 (16.5)	2 (5.2)	0.164
Major project 10 (7.0)	5 (4.8)	5 (12.8)	0.1
Treating hangover 10 (7.0)	9 (8.7)	1 (2.6)	0.187
Others 34 (23.8)	20 (19.2)	14 (35.9)	0.033

* One student can have more than one reason.

Table 5. Mean number and duration of energy drink consumption according to reasons for consumption during one month.

Energy drinks consumed		
Reason	Mean (standard deviation)	Median (lower quartile- upper quartile)
Study	3 (2.1)	2.5 (1-4)
Hangover	2.9 (1.8)	3 (1.5-3.5)
Long travel	2.3 (1.7)	2 (1-3)
Social parties	2.2 (1.5)	2 (1-3)
Major project	2.1 (1.8)	1 (1-3)
More energy	2.0 (1.4)	2 (1-2)
Long car driving	2 (1.6)	1 (1-2)
Sleep problem	1.9 (1.6)	1 (1-2)
Days of consumption		
Reason	Mean (standard deviation)	Median (lower quartile-upper quartile)
Study	3.1 (1.9)	2.5 (1-4.8)
More energy	2.4 (2.3)	1 (1-4)
Hangover	2 (0)	2 (2-2)
Sleep problem	1.8 (1.4)	1 (1-2)
Social parties	1.7 (1.1)	1 (1-1.5)
Long travel	1.8 (1.6)	1 (1-1.5)
Long car driving	1.1 (0.35)	1 (1-1.5)
Major project	1 (0.10)	1 (1-1.5)

Discussion

Energy drink consumption appears to be a popular practice among medical students at the Faculty of Medicine, KFMC, with over 70% of the students consuming a single brand. Students who consume more soft drinks tend to also consume significantly more energy drinks. There were significant gender differences, with males reporting significantly higher energy drink consumption than that of females. This finding is in agreement with other studies [3, 13].

There were 4.5 times more male energy drink users than female users in Dammam University.[13] The authors of that study explained this difference by suggesting that the use of energy drinks might be reduced in females because typical Saudi girls are less physically active than are typical Saudi males. Incidentally, energy drinks are mostly marketed as a way to increase physical performance.[13] Red Bull was the most popular energy drink in the present study. This result is in agreement with previously reported studies.[10-15]

Energy drinks are marketed to young adults, and marketing efforts may be particularly appealing to college students. Red Bull is reportedly a "functional beverage" that was designed to increase physical and mental performance and "is appropriate to drink during sports, while driving and during leisure activities".[3]

The reported reasons for energy drink consumption among medical students in FOM ,KFMC mostly involve studying, according to the quantity and duration of consumption. Long travel and social parties were also associated with energy drink consumption, which is in agreement with other studies.[8-14] All of these situations require extra energy,

which can be satisfied by the consumption of other safer nutritional items.

Students appear to prefer and enjoy these energy drinks because they are easily accessible, convenient, and available and because they provide a strong energy boost. Studies of other communities found that energy drink consumption is a popular practice among college students to enhance alertness or provide a short-term energy boost. This effect is particularly important after insufficient sleep, which creates a need for more energy in general, and while studying for examinations, working on major course projects and driving an automobile for a long period of time.[10]

The use of energy drinks in the present study was mostly associated with the side effects of palpitations and headache. Many previous studies have reported similar side effects.[10-15]

Studies in adult twins reveal that the lifetime caffeine intake, caffeine toxicity and caffeine dependence are significantly and positively associated with various psychiatric disorders, including major depression, generalized anxiety disorder, panic disorder, antisocial personality disorder, alcohol dependence, and cannabis and cocaine abuse/dependence.[6]Deaths attributed to energy drink consumption have also been reported in Australia, Ireland and Sweden.[12]

The levels of substances other than caffeine in energy drinks are generally far below the levels expected to deliver either therapeutic benefits or adverse events. However, caffeine and sugar are present at levels that are known to cause a variety of adverse health effects.[23] .The absence of regulatory measures in KSA in the past appears to have

encouraged the aggressive marketing of energy drinks, which have primarily targeted young males, for their psychoactive, performance-enhancing and stimulant drug effects, as has occurred in other countries, such as USA.[24].

The popularity of energy drinks seems to have increased among university students and other youths, and it continues to show an increasing trend. Concerns have been raised regarding the ingredients in energy drinks and their potential negative effects on health.[20]

The absence of regulatory oversight in many countries, including KSA, has resulted in the aggressive marketing of energy drinks, especially to young adults[25-28]. Recently, the authorities in KSA decided to prohibit energy drinks, and a strong resolution was taken by the council of ministers in this respect. The decision of the Council of Ministers is as follows, according to the official Saudi Press Agency (SPA):[29] .

- To prohibit advertising of any energy drink or advertising or promotional campaigns for any energy drink via any readable, audible or visible media organ or by any other "means."
- To prohibit energy drink companies, their agents, distributors and marketing associations from sponsoring any sporting, social or cultural events or taking any action that results in promotion.
- To prohibit the free distribution of energy drinks to consumers of all age groups.
- To prohibit the sale of energy drinks in restaurants and canteens within government facilities; education and health facilities; halls; and public and private sports clubs.

Upon this decision, factory owners and importers of energy drinks shall commit to write a message on the container of any energy drink in both Arabic and English languages warning of the harmful effects of energy "drinks." "This ruling is a very welcomed decision that is expected to help reduce consumption and the associated side effects of energy drinks.

Study limitations:

The study design is cross-sectional in nature, which does not offer strong support for the significant risk factors and the causation.

The data collected were self-reported and therefore suffered from all of the limitations of that method, including recall bias.

In addition, the frequency patterns of energy drink intake were posed in a situation and then treated as independent and distinct events, which may not have been the case. Other important variables were not included, such as smoking habits, dietary habits, real and perceived educational achievement and views of the students regarding the association of energy drinks with academic performance.

Conclusions

Using energy drinks is a popular practice among medical students, particularly when a student feels that he or she needs more energy; wants to be more awake for studying and social gatherings; or is coping with sleep problems. Consumption is associated with many side effects. Legal intervention strategies have already been chosen, and their full implementation requires close supervision.

Recommendations

An educational component is needed to emphasize the risks of the ingredients of energy drinks, particularly for students in secondary school and at the university level and for young populations in other sectors.

The adverse effects of energy drinks need to be included in curricula, particularly those of medical and other health colleges. A study that assesses all students in all colleges in KSAU-HS is highly recommended.

The results of the present study can be used to help design the study and questionnaire. Additional variables, such as more sociodemographics about sleep habits and perceived and actual academic performance, are warranted. Concerned authorities need to regulate the inappropriate consumption of energy drinks by adolescents and young adults.

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Competing Interests

The authors have no competing interests to declare.

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