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Energy Drinks Consumption among Iranian University Students and Associated Factors

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Abstract

Background: There is no study in Iran about the energy drinks (EDs) use by students. The purpose of this study was to evaluate the prevalence of EDs consumption and its related factors among the students.

Methods: This cross-sectional study carried out among students of Shahroud university of medical sciences. Using a standardized, pretested and self-administered questionnaire, the data were collected. The questionnaire consisted of 65 questions that asked the students' sociodemographic characteristics and their knowledge and habits of ED consumptions.

Results: Of all participants 66.3% were female, 63.1% of students live in dormitories and 6.9% and 19.9% of them live with friends and parents, respectively. Almost 11.5 percent of students are user of energy drinks. The most common reason to try an ED was ''its special tastes'' (36.2%), followed in order of frequency by ''to stay awake for long hours''. Logistic regression modeling of EDs use indicated that, male gender, students who live alone and higher monthly costs for personal requirements were also positively and significantly associated with EDs use.

Conclusions: Despite the low prevalence of EDs consumption in our study samples, male students, living alone and higher monthly costs for personal requirements are factors associated with more EDs consumption.

Keywords: Energy drink, Youths, University students, Iran.

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Introduction

EDs are drinks that have a relatively high caffeine content (range 50 - 505 mg caffeine / serving; 2.5 - 35.7mg Caffeine / oz).[1] ED use is very common, alone in 2006, a 5.4$ billion was spent in market in the United States.[1] Studies have shown that consuming energy drinks in combination with alcoholic beverages is preferred and this form of alcohol consumption have become a part of subculture in the US student parties.[2,3,4,5] Athletes are the main goals of using these drinks, however, later on the college youth expanded because they experienced a quick change in lifestyle.[6]

The market for these drinks has grown dramatically, for example, between 2004 and 2008, it shows a growth of 240%.[1,7] The use of energy drugs and other high-risk behaviors usually occurs together in adulthood and they are learned at the same time.[8,9,10] These drinks is widely used by the young people, especially students, for various reasons, for example

mixing EDs with alcohol, to improve attention, to increase the time and performance of exercise, to stay awake for long hours, to increase studying or reading skills and to reduce fatigue. Research suggests that EDs consumption may appear potentially harmful for some reasons. Caffeine is clearly associated with adverse health effects in sensitive individuals. High caffeine intake is associated with elevated blood pressure,[11] sleep disturbances[12] among adolescents, with the risk of late abortions, stillbirths[13] and low birth weight infants in women.

As another reason, the habit of mixing EDs with alcohol is consistently linked to drinking large quantities of alcohol during a drinking meeting and, as a result, alcohol-related events such as sexual violence or drunk driving occur more often.[5] Although users may believe that energy drinks reduce the unwanted effects of alcohol, research has shown that by combining energy drinks with alcohol, people cannot properly estimate their condition.[14]

Regardless of the consumption of the EDs mixed with alcohol, recent studies have shown that these beverages can play a role in dependence on alcohol and nonmedical prescription drug use[2,3] Adolescents and young people are at high risk for behavioral problems as a group. These behaviors can increase the risk of early mortality, disability, and chronic illness, which is rapidly expanding in developing countries like us in the past two decades.[15-17] Although some high risk behaviors have been studied in students in Iran, for example, in a study conducted at Tehran university, the prevalence of hookah and cigarette smoking was 34% and 24%, respectively, and alcohol, opium, cannabis and ecstasy tablets use were reported to be 17%, 3.1%, 2.6% and 0.7%, respectively,[18] based on our knowledge any studies have not been done in Iran about the EDs use by students.

Given that EDs are targeted to young adult consumers, global information is limited to the use of energy drinks by students,[19] so in this study, the consumption of EDs was studied in a group of students from different colleges. Also, the habits and factors affecting the preferences of such beverages were studied.

Materials and Methods

This study was a cross-sectional study carried out among students of three schools (health, medical and paramedical sciences) of Shahroud university of medical sciences (Shahrood, Iran). Approximately 500 students were invited to participate in the study overall. In the spring of 2017, on the day of data collection, all students attending classrooms were

invited to participate in the study and, if they agreed to the study. During the completion of the questionnaires, students were invited to eat cake and juice.

Using a standardized, pretested and self-administered questionnaire, the data were collected. The questionnaire consisted of 65 questions that asked the students' sociodemographic characteristics and their knowledge and habits of ED consumptions.

Ethics committee of the Shahroud university of medical sciences fully approved this research and granted an ethics code (IR.SHMU.REC.1394.155), and supported by research and technology deputy of Shahroud university of medical sciences (grant no: 9479). All participants were requested to complete the informed consent.

In the study, students were first asked about sociodemographic characteristics and personal habits. Then, while introducing students to the definition of energy drinks, a list of energy drinks in the market was shown to them, includes energy drinks, sports drinks and non-alcoholic beverages. They then asked questions about energy drinks and their EDs consumption.

In our study, energy drinks are defined as beverages that provide energy because of the content of caffeine and carbohydrates and presence of vitamin, minerals and other herbal supplements like ginseng and guarana in these drinks.[20]

Screening of the data for missing values and outliers was done before the data analyzing. Descriptive statistics were conducted to examine and describe participants' EDs use. Analysis carried out for modeling with the ability to estimate statistical significance predictors of ED consumption (users versus nonusers). Age, gender, family type (nuclear against the other), health insurance, sleep habits (regularly against irregularities), smoking (always against never), alcohol consumption (always against ever), place of residence with family / sister and brother and vice versa), monthly income, mother and father education, eating breakfast (regular versus unusual / none) and doing exercise (regularly versus irregular)were examined for potential association with energy drinks because these factors were studied in previous studies.

The SES index was determined using principal component analysis (PCA); and the first component, with a total variance of 19% and was used as the SES score. SES scores above the 80th percentile were categorized as rich; SES scores below the 40th percentile as poor, and those in the middle as moderate.

A logistic regression model was used for identifying factors associated with ED use. Backward stepwise selection method was used to select the best of the following variables. It begins with the full model containing all variables, and then iteratively removes the least useful variable, one-at-a-time. Then, best subset of variables was selected.

Results

Completed questionnaires were delivered by 407 students, yielding an estimated response rate of 81%., with ages from 18 to 28 y, with a mean ± standard deviation of 21.52 ± 2.46 y. Table 1 presents the distribution of sociodemographic

characteristics of study participants. Of the 407 students included in this analysis, 66.3% were female. Of the total participants, (90, 22.1 %) students were from the health school, (171, 42 %) students were from the medical school, and (146, 35.9 %) students were from the paramedical school.

Table 1. Distribution of demographic features of participants in the study

Characteristics	No.	Percentage
Gender		
−Male	137	33.7
−Female	270	66.3
Marital status		
−Single	370	90.9
−Married	31	7.6
−Unknown	6	1.5
Age groups		
−≤20	123	30.2
−21-25	259	63.6
−≥26	17	4.2
−Unknown	8	2.0
Roommate (the number of people students live with)		
−0	20	4.9
−1-2	63	15.5
−3-4	207	50.9
−≥5	88	21.6
−Unknown	29	7.1
Living status (shares of residency place with)		
−Parents and/or siblings	81	19.9
−Friends	28	6.9
−Lives in dormitory	257	63.1
−Lives alone	33	8.1
−Unknown	8	2.0
Monthly costs for personal requirements (Rials)		
−≤1,000,000	31	7.6
−1,000,001-3,000,000	180	44.2
−3,000,001-5,000,000	99	24.3
−>5,000,000	32	7.9
−Unknown	65	16.0
Mother educational attainment		
−Illiterate	13	3.2
−Primary school	57	14.0
−Middle school	47	11.5
−High school	114	28.0
−College/university	131	32.2
−Unknown	45	11.1
Father educational attainment		
−Illiterate	7	1.7
−Primary school	34	8.4
−Middle school	51	12.5
−High school	105	25.8
−College/university	162	39.8
−Unknown	48	11.8
How to dress		
−Sport dressing	186	45.7
−Classic dressing	106	26.0
−Veil dressing	99	24.3
−Unknown	16	3.9
Socioeconomic status (SES)		
−Poor	107	26.3
−Moderate	106	26.0
−Rich	107	26.3
−Unknown	87	21.4
Residency		
−Rural	26	6.4
−Urban	369	90.7
−Unknown	12	2.9

Of all participants, 9.3 % were the first year students. The 20.1 and 9.8 percent, respectively, were in the second and third

grade of the university. The rest of the students (60.8%) belonged to the fourth grade and above. 63.1% of students live in dormitories and 6.9% and 19.9% of them live with friends and parents, respectively. They lived alone in 8.1% of cases, while, there are no reports of 8% of the participants about their residency places.

Students were asked to clear monthly costs for personal needs, except for rent, school payment, etc. 16% (65) of students did not report that, however, 64 % (289) of them reported their monthly costs between 500000 and 3000000 Rials.

Table 2 shows the distribution of some personal habits of participants in the study. According to student reports, more than 78% of them had regular sleep and their average sleeping hours in 24 hours were 7.69 ± 1.71 hours. Of the total number of students, 84.3% and 67.3% never used cigarettes and alcohol even once, respectively. The highest and lowest risk behaviors that students were asked to do was not use safety belts in the car and have a violent behavior with friends, respectively. Walking and running, football and bodybuilding were the most favorite sports among the students. In the study`s participants, 69.3% reported that they did not engaged sports regularly.

11.5% of students reported that they having used energy drink. Most of them (66%) started using ED before entering to the university. Table 3 shows the results of using EDs and the behavior of the participants in the study.

The reasons for not using energy drinks in nonuser students were: the probability that it may be harmful is in 53.2%, lack of knowledge of its compounds at 17.5%, having high calories in approximately 1%, addictive probability in about 1%, and the high price is in 1.7% of cases. 25.6% of students did not provide a reason for non-consumption.

The most common reason to try an ED was ''its special tastes'' (36.2%), the next reason is to "stay awake in long hours" and "to increase personal performance". In most cases, Students reported first using EDs in conjunction with a friend.

In binary analysis, using of EDs (compared with nonuse) was significantly related to sex, marital status, number of people the students live with, share of residency place (with family, dormitory, loneliness), type of dressing, pattern of energy drink, smoking, special sports (gym, football, volleyball, other), mother's education, student's monthly fees.

Table 4 shows association between EDs use and SES. This relationship shows that with the improvement of SES, the consumption of energy drinks increases, although there is no significant statistical significance.

Table 5 presents the final logistic regression model for ED use by participants in the study (users and nonusers). Based on regression model, gender, monthly costs for personal requirements and living alone or with friends and family were shown significant association with EDs use. Logistic regression modeling of EDs use (user versus nonuser) indicated that, men were 2.3 times more likely than women to use energy drinks, students who live alone were 5.6 times more likely to use energy drinks than those living in a dormitory or with family

and friends. Higher monthly costs for personal requirements were also positively and significantly associated with EDs use.

Table 2. Distribute some of the personal habits of the participants in the study

Characteristics	No.	Percentage
Sleeping habits		
−Regular	321	78.9
−Irregular	82	20.1
−Unknown	4	1.0
Sleep hours in 24 hours (on average)		
−≤6	86	21.1
−7	86	21.1
−8	129	31.7
−≥9	100	24.6
−Unknown	6	1.5
Cigarette smoking		
−Never smoked	343	84.3
−Non-permanent smoker	29	7.1
−Current smokers	14	3.4
−Unknown	21	5.2
Alcohol drinking		
−Never drinker	274	67.3
−Non-permanent drinkers	7	1.7
−Current drinkers	21	5.2
−Unknown	105	25.8
Risky behaviors		
−Do use of seatbelt	212	52.1
−Fast driving	199	48.9
−Carry guns /weapons	46	11.3
−Violence to / from friends	64	15.7
Doing exercise		
−Walking/Running	275	67.6
−Football	35	8.6
−Body Building	88	21.6
−Others	55	13.5

Table 3. Use of ED and related behaviors among participants in the study

Characteristics	No.	Percentage
Use of EDs		
−No	360	88.5
−Yes	47	11.5
Main reason for using energy drinks (n = 47)		
−Because of its special tastes	17	36.2
−To increase the time of exercise and boost performance during exercise	5	10.6
−For mixing and drinking with alcohol	3	6.4
−To stay awake for long hours	14	29.8
−To increase personal performance when studying / reading	12	25.5
−To reduce fatigue	9	19.1
Timing of first use of energy		
−Before studying at university	31	66.0
−University	11	23.4
−Unknown	5	10.6
Any person companion in the start of energy drink		
−Alone	10	21.3
−Friends	22	46.8
−Family	11	23.4
−Unknown	4	8.5
Family member who drink energy		
−Yes	18	38.3
−No	24	51.1
−Unknown	5	10.6
Pattern of consumption		
−Daily	2	4.3
−Monthly	10	21.3
−Others	29	61.7
−Unknown	6	12.8

Table 4. ED users by socioeconomic status

SES	EDs	
	Users	Non users
Poor	9 (8.4%)	98 (91.6 %)
Moderate	12 (11.3%)	94(88.7%)
Rich	15 (14.0%)	92 (86.0%)
Pvalue	0.43	

Table 5. Logistic regression model for ED users

Variables in the model	Beta	SE	Odds ratio	Pvalue
Sex (male versus female)	0.805	0.374	2.236	0.031
Monthly costs for personal requirements (Rials) (≤ 5,000,000 versus > 5,000,000)	-1.519	0.451	0.219	0.001
Living status (shares of residency place with				0.014
−Alone versus family	1.729	0.685	5.637	0.012
−With friends or in dormitory versus family	0.542	0.578	1.720	0.348
Depression index	-1.108	0.211	7.010	0.001

Discussion

According to our knowledge, this is the first study that specifically tries to identify EDs consumption in Iran. In the study ever ED users were more likely to report they started using ED before starting the university.

Regardless of the experience of the taste of energy drinks, in our student samples, the most common reasons for ED use were to stay awake for long hours and to increase personal performance when studying or reading. Considering the content of these beverages is more caffeine,[21] it seems, the main purpose of using and the most of these ED effects are related to the amount of caffeine in these drinks.

In the present study we showed the using EDs among students is for a variety of reasons: to increase the time of exercise and to boost performance during exercise, to experience of its special tastes, to stay awake for long hours, to increase personal performance when studying or reading, to reduce fatigue. Almost all of these reasons for using EDs are mentioned in other studies. Although in our study, the use of EDs was not a substitute for other beverages.[19,1,22,23,24] The consumption of EDs with alcohol in our study was observed only in 6.4% of students, however, in previous studies almost 50% of cases have been reported, EDs use with alcohol.[25,26,27] The reason for this difference, it seems to be due to the low level of alcohol consumption in our community.

The prevalence of EDs use in our study was lower than in other studies. In past studies in other places the prevalence rates of EDs use in students varies from 34% to 75%.[15,20,28] Attila et al have report ever use of EDs about 48.3% in their samples.[19] According a study conducted in the United States, 34% aged 18 to 24 years regularly consumed EDs. Based on that study, the EDs use percentage in the age group of 25 to 34 was 22%, which indicates a decrease in consumption with increasing the age.[29] In a recent study, only half of the students used EDs at least once a month.[15]

The prevalence of EDs in the current study is similar to the results of Friis et al study.[30] Although their study was a population-based study and was not specific to students. The low prevalence of EDs in the present study can be due to that the majority of nonuser students believed that EDs may be harmful or not confident about the content of these drinks, however, in other studies, believing in harm and lack of knowledge of the ED components is not the main reason of not to use of EDs.[19,31] In the Friis et al study, EDs consumption among people with lower education is higher than those with higher education levels. It seems that the high education in our academic samples, similar to the results of the study by Fries and colleagues, led to less use of EDs.

In our study, energy drinking in boys was higher than that of girls, this finding is similar to the result of a study conducted in Denmark that EDs consumption typically which has been considered as a male phenomenon,[30] however, in the study by Malinauskas B.M and et al, the EDs using in female students was higher than that of male students.[15] It was shown in another study, there were no significant sex differences in use of Eds.[4] The reason why more EDs are consumed by boys in our study can be the result of a greater demand for energy and excitement from them.

In the present study, most students reported, they first tried EDs with friends. Although most of them mentioned the use of drinks were before the university began. The recent study has shown the same result.[19]

Although the socioeconomic level of participants in the study did not relate to the consumption of EDs, the monthly mean costs for personal requirements of students was directly related to the amount of EDs consumption. In a research was done by Attila and et al the same result has been reported.[19] EDs use by students living alone is higher than those who live with their family or friends. Similar to the same pattern of energy drink consumption in other studies has also been reported.[19,32] Although, the consumption of EDs it shows an inverse relationship with the level of education of the participants in some studies,[30,33] we could not show such a relationship. This may have been due to the more homogeneity of the level of education in our samples.

While the current study is an important first step in showing the state of EDs use in our country, it is not without limitations. Since our sample includes a small proportion of current ED users, the comparison between current, ever and never users is not possible. It seems infrequent ED users may have experienced difficulty responding to study questions.

Future research should examine the difference between never, ever, and current ED users. Also, Prospective studies are needed to understand the relationship between the use of ED and other real and risky behaviors.

Fortunately, university students in Iran are not heavy consumers of EDs, however, little is known about the impact of consumption. We indicate, male gender, students who live alone and higher monthly costs for personal requirements were positively and significantly associated with EDs use among students in Iran.

Acknowledgement

Conflict of Interest

The authors declare that they have no conflict of interest.

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