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Consumption's Pattern and Knowledge of Athletes about Energy Drink in South of Iran (Shiraz)

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Abstract: During the last years, sports and energy drink consumption has continued to gain popularity among young people in Iran. Obviously, according to the fact that 66% of 70-million population in Iran are aged less than 30 years and also a growing consumer purchasing power as a result of a growing economy, urbanization and access to quality raw material have been the main drivers of the rapid growth of the energy drinks industry and clients. The purpose of this study is to determine the consumption's pattern of energy drinks among athletes. Totally, 800 athletes (400 males and 400 females) from Fitting and bodybuilding Clubs in Shiraz were included in this study. Subjects were expected to do a questionnaire which was about their personal characteristics, knowledge about energy drinks and their consumption frequency. Mean age was 24.9 ± 6.6 in sport men and 27.5 ± 9.4 in sport women. Participants were divided into two groups: 54.7% consumers of energy drinks and 45.3% non-consumers. Male consumers were 57.5% which was higher than female consumers. 51.4% of energy drink consumers had university degree, 36% had diploma and 12.6% did not finish high school while none of them were illiterate. Using energy drinks is common among athletes especially in Fitting and bodybuilding Clubs for a variety of reasons. Furthermore, side effects from consuming energy drinks are not sensible. Results of this study showed that most of the participants do not know about ingredients of energy drinks. Our findings have numerous practical applications for athletes.

Key words: sports, athletes, energy drink

INTRODUCTION

Soft and energy drink consumption has exploded over the past three decades (Nielsen and Popkin, 2004). Sugar sweetened energy drinks became a major source of added sugar in the American diet and have been linked to adverse nutritional and health consequences such as dental caries and obesity (Heller *et al.*, 2001). Furthermore, evidence also supports an association between soft drink consumption and decreased Bone Mineral Density (BMD) (Bray *et al.*, 2004).

Similar to global pattern Energy drinks consumption in Iran has continued to gain popularity among young people especially in athletes. Those drinks have been promoted to increase performance and endurance. A growing consumer purchasing power as a result of a growing economy, urbanization and access to quality raw material have been the main results of the rapid growth of the energy drinks industry. Moreover, almost 66% of 70-million population in Iran are aged less than 30 years and they are eager to use energy drinks (www.atiehbahar.com).

The main consumers of energy drinks are athletes between 18 to 35 years old. Studies about energy drinks were mainly conducted in nonathletic population. However, among athletes, in a highly competitive world of sports, the concern about energy must go beyond

health and socially desirable activity. These facts motivated us to do this research.

Fluids are a vital requirement for humans, but fluid intake can be obtained from a variety of fluid sources other than water. The selection of appropriate fluids, timing of the intake and supplement choices are important for optimal health, especially in young people. The Beverage Guidance Panel, had initiated by Popkin *et al.* (Attila and Cakir, 2010). Energy drinks are beverages (e.g., Red Bull, Venom, Burn and Adrenaline Rush) that contain large doses of caffeine and other legal stimulants such as taurine, carbohydrates, glucuronolactone, inositol, niacin, panthenol and b-complex vitamins. Hundreds of different brands on the market have high caffeine content, ranging from a modest 50 mg to an alarming 505 mg per can or Bottle (Bigard, 2010). Energy drinks have been found to improve attention and/or reaction times and indices of alertness in some studies; the combination of caffeine and glucose can ameliorate deficits in cognitive performance and subjective fatigue during extended periods of cognitive demand. However, several ingredients of energy drinks, with sucrose and caffeine taking the lead, may have unwanted health consequences in youngsters and should be used carefully. Energy drinks have stimulating properties that

can boost heart rate and blood pressure, dehydrate the body, may aggravate the effects of other stimulants and prevent sleep.

Unlike sports drinks (the use of which is supported for athletes), energy drinks should not be used while exercising because the combination of fluid loss, sweating and the diuretic quality of the caffeine can leave the user severely dehydrated. The aim of this study was to assess Knowledge of bodybuilder athletes and to provide the much needed guidelines on energy drinks intakes for the athletes during training.

MATERIALS AND METHODS

This cross-sectional study was conducted in Shiraz, Iran, from January to June 2011. After the participants were given explanatory information, they were asked to provide their oral consent for contribution. Then participants were asked to take part in an interview, which was conducted by a trained interviewer. The athletes and types of sports selected were based on type of sport as determined by the Sports Council. A total of 425 male athletes and 425 female athletes participated in the study. All measurements were conducted during training. An investigator was available throughout the data collection session to provide clarification or to answer any queries on the survey.

Data collection: The investigation was carried out in Shiraz city the capital of Faris province as there were a lot of sports clubs. A sample of 990 athletes was drawn randomly from the sport clubs in Shiraz city.

Data was collected with a questionnaire designed by a scientific group. Content validity was verified by two pharmacologists and a community medicine specialist. The reliability of the questionnaire was checked in a pilot study consisted of 31 sports women and 29 sports men with a Cronbach's alpha = 0.80. A questionnaire and observation schedule having questions related to the following parts: social and demographic, knowledge and practice, as well as side effects and withdrawal symptoms experienced by energy drink consumers. The demographic part composed of information about age, sex, education level (illiterate to university degree), job and frequency of exercise ranged from every day to occasionally. In the next part, we asked them about energy drinks ingredients, side effects and contraindications. If respondents named at least two ingredients and two side effects, they scored 1 for each question. In contraindication questions we asked whether energy drinks are allowed for every body or not, then they express their opinion about contraindication of energy drinks for diabetic patients, pregnant women, children and patients with renal and cardiovascular problems. For each correct answer they got 1 mark. So, the minimum and maximum score in knowledge part was between 0 and 8. In practice part, the first question

was about energy drink consumption. If the participant answered "yes", the interview continued otherwise it was stopped. The rest of questionnaire was about the frequency of usage (every day, every other day, twice a week, weekly, twice a month, occasionally), situations made interviewee to consume and sources of recommendation for consumption. Additionally, they were asked about the places where they mostly bought energy drinks, the places they usually use energy drinks and the reasons encourage them to insist on consuming. In the last part the interviewer asked energy drink consumer whether they experienced reflux, headache and palpitation after consumption. If their answers were "yes", they would ask about the frequency of each mentioned side effect. In the last part drinkers were asked to name experienced withdrawal symptoms in the lack of energy drinks. The collected data were scored, categorized and analyzed statistically.

Statistical analysis: The data were analyzed with SPSS V. 16 software. The Mann-Whitney U test was used to identify the differences in knowledge, attitude and practice between males and females and also between university faculty members and high school teachers. The Pearson correlation coefficients were calculated to determine the relationships between different items. Differences with a P value less than 0.05 were considered statistically significant.

RESULTS

Generally, 821 out of 850 (96.6%) athletes accepted to be interviewed. Mean age was 24.9±6.6 in sport men and 27.5±9.4 in sport women. In accordance to the objectives of the study the data were collected with the help of questioner and observation schedule were analyzed and presented in following tables and figures. Participants were divided into two groups: 449 consumers of energy drinks (54.7%) and 372 non-consumers (45.3%). Male consumers were 258 individuals (57.5%), significantly ($p < 0.001$) higher than female consumers. 51.4% of energy drink consumers had university degree, 36% had diploma and 12.6% did not finish high school while none of them were illiterate. In non-consumers group 49.2% had university degree, 39.9% had diploma, 12.2% did not finish high school and 1.1% were illiterate. Most of the athletes consume energy drink (50.2%) used to exercise every day, while in non-consumers' group most of them (56.3%) exercise every other day (Fig. 1).

Mean score of knowledge was higher in non-consumers' group (3.8±2.3) compare to consumers' (3.7±2.1) without any statistical significance ($p = 0.16$). The percentage of having acceptable knowledge about energy drinks in con-consumers and consumers athlete were 27.2% and 22.9%, respectively. In consumers group 232 out of 449 (51.7%) named at least two

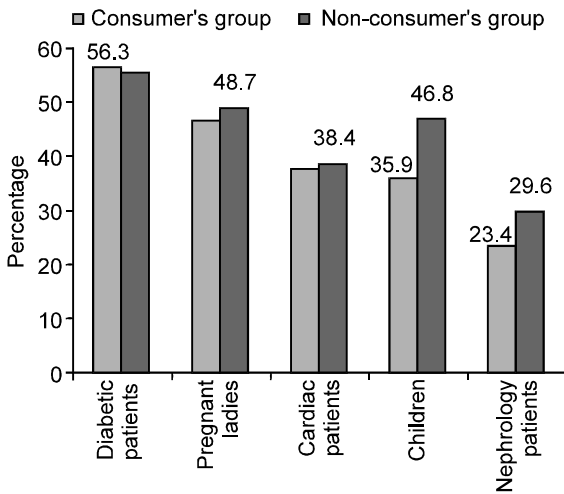


Fig. 1: Frequency of exercise in athletes who consumed energy drink versus non consumers

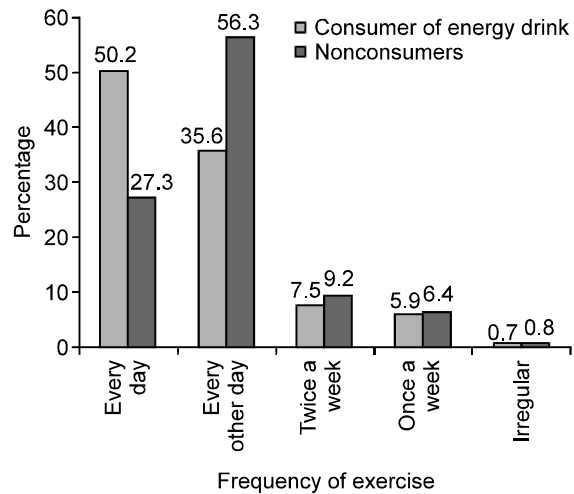


Fig. 2: Percentage of athletes who thought energy drink was prohibited for diabetic patients, pregnant ladies, children, patients with cardiac and nephrology problem

ingredients of energy drinks while it was 23.1% (86 athletes) in non-consumers group ($p < 0.001$). Most of the athletes categorized in non-consumers group (69.3%) named at least one side effect for energy drinks while it was 50.3% in consumers group, which was statistically significant ($p < 0.001$). The mentioned side effects by respondents were hyperglycemia (27%), weight gain (17.5%), palpitation (13.8%), gastrointestinal discomfort (11.7%), osteoporosis (11.1%), dependency (9%) and hypertension (8.4%). Other stated side effects (1.5%) were stroke, hormonal imbalance and renal problems. Most of the respondents in both consumers (85.5%) and non-consumers (81.7%) groups, acclaimed that energy drink is not permitted for all people. They thought energy drink is forbidden for diabetic patients, pregnant ladies,

children and those who had cardiovascular or renal disease (Fig. 2).

271 athletes out of 449 energy drink user (60.4%), used to consume recreationally. Drinking twice a week was the second most frequent habit in both sport men (14.5%) and women (19.8%). The pattern of consuming between male and female athletes is shown in Table 1. The situations that encourage athletes to use energy drink is shown in Table 2. The most frequently stated reason for consuming energy drink was need for excess energy (57%). Other reasons were sever exhaustion (37.2%), fluid compensation (13.1%), need for supplement (12.7%), need for staying up at exam night

Table 1: Frequency of energy drink consumption among athletes who admitted using it

Consumption frequency	Total		Men		Women	
	N	%	N	%	N	%
Everyday	26	5.8	23	8.9	3	1.6
Every other day	32	7.1	22	8.5	10	5.2
Twice a week	65	14.5	51	19.8	14	7.3
Weekly	31	6.9	27	10.5	4	2.1
Twice a month	24	5.3	14	5.4	10	5.2
Recreational	271	60.4	121	46.9	150	78.6
Total	449	100.0	258	100.0	191	100.0

Table 2: Situations that encourage athletes to use energy drink

Reasons of consumption	Total (N = 449)		Men (N = 258)		Women (N = 191)		p-value ¹
	n	% ²	n	% ³	n	% ⁴	
Need energy (in general)	256	57.0	157	60.9	99	51.8	0.03
Exhaustion	167	37.2	85	32.9	82	42.9	0.03
Fluid compensation	59	13.1	29	11.2	30	15.7	0.16
Need for supplement	57	12.7	41	15.9	16	8.4	0.01
Staying up for exams	49	10.9	24	9.3	25	13.1	0.20
As a new experiment	17	3.7	6	2.3	11	5.7	0.16
Long time driving	12	2.7	7	2.7	5	2.6	0.95

¹P-value less than 0.05 is considered significant. ²(n/449)*100. ³(n/258)*100. ⁴(n/191)*100

Table 3: Sources of recommendation for consumption of energy drink among athletes

Source of recommendation	Total (N = 449)		Men (N = 258)		Women (N = 191)	
	n	% ¹	n	% ²	n	% ³
Myself	217	48.3	127	49.2	90	47.1
Friend	129	28.7	72	27.9	57	29.8
Advertisement	61	13.6	30	11.6	31	16.2
Coach	43	9.6	30	11.6	13	6.8
Family member	26	5.8	10	3.9	16	8.4
Club employee	4	0.9	2	0.8	2	1.0

¹(n/449)*100. ²(n/258)*100. ³(n/191)*100

Table 4: Frequency of palpitation, headache and reflux according frequency of consuming energy drink

Frequency of consumption	Palpitation		Headache		Reflux	
	Yes	No	Yes	No	Yes	No
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Everyday	11(42.3)	15(57.7)	7(26.9)	19(73.1)	9(34.6)	17(65.4)
Every other day	7(21.9)	25(78.1)	3(9.4)	29(90.6)	10(31.3)	22(68.8)
Twice a week	10(15.4)	55(84.6)	9(13.8)	56(86.2)	13(20.0)	52(80.0)
Weekly	9(29.0)	22(71.0)	3(9.7)	28(90.3)	7(22.6)	24(77.4)
Twice a month	4(16.7)	20(83.3)	1(4.2%)	23(95.8)	7(29.2)	17(70.8)
Occasionally	46(17.0)	225(83.0)	24(8.9)	247(91.1)	34(12.5)	237(87.5)
P (Yes versus No) ¹	0.028		0.072		0.005	

¹P-value less than 0.05 is considered significant

(10.7%), try as new experiment (3.7%) and longtime driving (2.7%) (Table 2).

217 out of 449 (48.3%) consumed energy drink without receiving recommendation from others. Other athletes received a recommendation for consuming energy drink from their friends (28.7%), their coach (9.6%), family member (5.8%), health club employees (0.9%) and 13.6% got the message from advertisements (Table 3). Respondents acclaimed that, they bought energy drinks mostly from supermarkets (86%), health clubs (11.7%) and restaurant (2.4%). The most prevalent place for drinking were at home (34.7%), at health clubs (31.6%), at parties (24.1%), at the university (6%), at work (6%) and at the restaurant (5.3%). They also were asked about the factors stimulate consuming energy drink. According to these factors the most stimulator was taste of energy drink (41.4%), its brand (29%), advertisements (19.4%), availability (11.1%), the price (4.7%) and attractiveness of its packing (4.5%).

154 out of 449 athletes (34.3%) experience one or more side effects. 19.4% of them had palpitation, 17.8% had reflux and 10.5% experienced headache.

344 athletes (76.6%) reported no signs and symptoms after withdrawing energy drinks. 105 athletes had experienced headache (8.7%), insomnia (8.5%), impatience (7.1%), irritability (6.2%), anxiety (5.6%) and hypertension (2.4%) (Table 4).

117 out of 449 (26.1%) athletes reported consuming energy supplements. 3 (2.5%) athletes did not answer how long they had been using energy supplements. 114 athletes (35.1%) used energy supplements for more than one year, 28% between 1 and 6 months, 22.8% less than 1 month and 14% between 7 and 12 months.

DISCUSSION

The purpose of this study was to investigate knowledge among body builder athletes. The energy-drink market has grown exponentially over the past decade. The absence of regulatory oversight in many countries has resulted in aggressive marketing of energy drinks Over the world, targeted primarily toward young adults (men in particular). Using energy drinks is a popular practice among bodybuilder athletes for a variety of situations: excess energy, exhaustion, fluid compensation, need for supplement, need for staying up at exam night, try as new experiment and longtime driving. Some previous work suggested that young people may use energy drinks as "natural alternatives" to other fluids, "to boost performance and concentration," "to stay awake before exams" (Bovard, 2008). Almost all these reasons were mentioned as the underlying factor for "trying/using energy drinks" in our study population. In addition to the frequency of an agent, the associated burdens of morbidity and mortality determine its importance as a public health concern. Although energy drinks are targeted to young adult consumers, up to our knowledge, there are few research regarding the health effects of energy-drink consumption by body builder athletes. Clauson *et al.* (2008) recently published a review article on the benefits and adverse effects associated with the consumption of energy drinks. Based on published articles written on energy drinks, the investigators concluded that most energy drinks contain natural products and that amounts of guarana, taurine and ginseng found in popular energy drinks are far below the amounts that is expected to deliver therapeutic benefits or adverse events. However, high

amounts of caffeine and sugar in energy drinks caused a variety of adverse health effects. Caffeine in the quantities present in most energy drinks may lead to insomnia, nervousness, headache, tachycardia and seizures (Bovard, 2008; Clauson *et al.*, 2008). In children and adolescents who are not habitual caffeine users, vulnerability to caffeine intoxication may be markedly increased due to an absence of pharmacologic tolerance. Genetic factors may also contribute to an individual's vulnerability to caffeine-related disorders including caffeine intoxication, dependence and withdrawal (Bigard, 2010). Finding implied that the effects of caffeine on blood pressure may be significantly underestimated by the measurement of blood pressure at the brachial artery and caffeine-related circulatory health hazards could be underestimated in routine physical examination. Young individuals may have physiologic proneness to health hazards, may have some undiagnosed pathologic conditions (such as heart problems), may underestimate their pathologic signs and symptoms with the false belief that "diseases are for the elderly" and may not seek help in the early stages (David, 2009; Malinauskas *et al.*, 2007). Thus, it is important to make young individuals aware of the potential health hazards of energy drinks that they may face. It would be effective to introduce healthy nutritional habits and drinks to young adults, besides replacing "unhealthy" socializing tools (cigarette smoking, alcohol or energy drink consumption, etc.) with healthier ones (Duchan *et al.*, 2010; Grosz and Szatmari, 2010). Moreover, the consumption of energy drinks has enhanced rapidly in recent years. Energy drinks usually contain high fructose corn syrup, vitamin B, minerals, caffeine, keratin and other unhealthy addition. Energy drinks tend to have 140 calories per eight ounce and they may add unnecessary and excessive calories to athletes. Although there is no human requirement for caffeine, even low doses of caffeine (12.5 to 100 mg) improves cognitive performance and mood. There are increasing reports of caffeine intoxication from energy drinks (Higgins *et al.*, 2010). The amount of caffeine in these drinks is about 80 to 360 mg in each can. The high level of caffeine may come from large amount of synthetic caffeine or natural form of caffeine like Guarana. This amount of caffeine is addictive. The other side-effects of this amount of caffeine are anxiety, depression, respiratory and cardiovascular disorders and headache. Caffeine often has the effect of making a person feel energized. Although low doses of caffeine (12.5 to 50 mg) have been found to improve cognitive performance and mood and 200 mg doses have been found to improve cognitive task speed and accuracy and increase alertness among young adults. The high concentration of both carbohydrate found in energy drinks may also be a source of being bloated.

Abdominal cramping may also occur. High concentration of both carbohydrate and caffeine can cause diarrhea (Pennington *et al.*, 2010; Steinke *et al.*, 2009).

In our study group, most participants reported that they prefer energy drinks to feel "energetic," to concentrate while studying and/or to stay awake. Most of these effects of energy drinks are related to the caffeine content of such drinks. The greater the caffeine concentration, the more likely will the bodybuilder athletes experience such effects and that they will continue consuming such drinks. It is important to note that the stimulating properties of energy drinks can boost the heart beat and blood pressure, dehydrate the body and prevent sleep. Due to the fact that individuals' responses to caffeine vary between different persons, young individuals should be careful in consuming caffeine including drinks (David, 2009). Studies about the hemodynamic effects of acute caffeine intake in young adults' aged between 21 and 26 had shown that heart rate was increased 4.5 hrs after caffeine consumption. In a randomized, double-blind study found that acute caffeine intake significantly increases central blood pressure and large artery waveform transmission and decreased pressure amplification in healthy adults (Malinauskas *et al.*, 2007). A limitation of this study is that a convenience sample without a control group was used. In addition, possible confounding factors were not controlled for.

Conclusion: The assessment and determination of the knowledge about the healthy usage of energy drinks is essential for a successful achievement of athletes not only during a game, but also along the whole sportive season and such information can and must be used by the coach to change the player's function with the purpose to maximize the performance. The current study revealed most of the participants do not have enough knowledge about energy drinks perhaps suggesting that energy drink consumption did not intellectual in this population. This finding may imply that education needs to be addressed to ensure an adequate consumption of energy drink products. Thus, health policy makers should focus on strategies to promote the knowledge and awareness of the athlete about healthy usage of energy drinks for improving their health and performance.

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