

ENERGY DRINKS CONSUMPTION AND ITS RELATIONSHIP WITH HYPERACTIVITY/INATTENTION BEHAVIOUR AMONG THE INTERMEDIATE AND HIGH SCHOOL MALE AND FEMALE STUDENTS

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ABSTRACT

BACKGROUND

New studies has revealed the consumption of energy drinks as a common, linked with potential risky hyperactivity/inattention behaviour among the adolescent and especially college students.

To assess the prevalence of the energy drinks consumption and to evaluate hyperactivity/inattention behaviour symptoms among the adolescent intermediate and high school male and female students in Abha city.

MATERIALS AND METHODS

A cross-sectional study. The self-administered questionnaires were distributed among students who were studying in the intermediate and high school. Schools were randomly selected and all students (N=602) participated with consent. Total sample size included 602 students, 50% students from intermediate school and 50% students from high school. The tools used in the present study to collect the information from the students were a structured standardised questionnaire includes the basics characteristic, demographic and consumption of energy drinks related information.

RESULTS

Prevalence of the energy drinks consumption among students studying in intermediate and high school level was 303 (50.3%). Male 162 (53.3%) are more consuming energy drinks than female 141 (46.7%). Students who are studying in high school (56.1%) drinking more energy drinks than students (43.9%) in higher level. Mean score of SDQ was 21.53 ± 5.414 falling in abnormal category. Mean \pm SD score of the hyperactivity subscale of the SDQ was 3.76 ± 1.980 . Female students 66 (21.9%), $p=0.162$ are more likely to score hyperactivity subscale compared to male students 52 (17.3%) (Table 1). Bivariate logistic regression analysis (Table 2) revealed that there was a significance association found with risk of hyperactivity/inattention (OR=2.47, 95% CI=1.61, 3.78) who consumed energy drinks. Most of the types of energy drinks types were associated with hyperactivity as regression analysis results shown. No association observed with study levels.

CONCLUSION

Energy drinks consumption among students of Abha City studying in high school and intermediate has been seen very high. Parents need to be more educated about the potential risk of energy drinks. Bottles should be labelled with content information and its health effects so that students can take more precautions. Health authorities can play very vital role in executing the health campaigns and programs related to harmful effects of energy drinks.

KEYWORDS

Energy Drinks, Hyperactivity/Inattention, Strength and Difficulty Questionnaire (SDQ), Adolescent Students.

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INTRODUCTION: Energy drinks consumption is very popular among children, which contain high amount of sugar and caffeine with other ingredients, but poor nutritional value and increased calorie intake leading to obesity among adolescent.¹ Manufacturers are focusing the targeted

population like students and athletes, etc. to sale their product and the effects of energy drinks maybe helping in concentration and to improve the performance.² Consuming the energy drinks among adolescents linked with risk taking.³ Energy drinks consumed at large scale in Middle

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East and in western countries. In a study, 55% males and 26% females consumed energy drinks in Dammam University.⁴ The prevalence of energy drinks account for 82% in Czech Republic, 48% observed in Greece and 68% in Europe are popular between 15-18 years age group (73%).⁵

However, the consumption of energy drinks was found very high among males.⁶ Greater sweetened beverages consumption was associated with increased risk of hyperactivity/inattention behaviours among middle school children. Of all beverages types considered, only energy drinks had an independent association with risk of hyperactivity/inattention behaviours symptoms.⁷ In Turkey, students reporting consumption of energy drinks were 66% more likely to be at risk for hyperactivity/inattention symptoms.⁸ It was 46% in study done in US⁹ and in Saudi Arabia, a study done in hail reported 68.9% unsafe behaviour in middle school and 75% in high school.²

Adolescent period faces a lots of challenge and problems to young, which may put the young under same kind of stress, so they used to try every new thing and they know something dangerous to theirs lives and behaviour with knowing like drinking energy drinks and ADHD occurs in 8% to 10% of US school going children and maybe more prevalent in children with heart diseases. Stimulants are associated with ADHD, which may increase heart rate and blood pressure.⁹ So, it is so important and necessary to conduct such a study to know how much these symptoms are prevalent linked energy drink. This matter raises the significance of mounting awareness of community concerning the ingredients with potential hazards in energy drinks used in day-to-day life. We conducted this study in Abha in adolescent students, which has not been conducted before in the past.

METHODOLOGY: A cross-sectional study on teenage students in between age group 11-17 (male and female) was conducted in Abha City. The self-administered questionnaires were distributed among students who were studying in the intermediate and high school. Schools were

randomly selected and students were excluded those who had diagnosed mental illness participated with consent.

The true value of the population will be 5 percentage point of the prevalence of 60% to be 95% confidence. The required sample size was calculated to be 369. In order to achieve accuracy at desired level, the final sample was 602. Total 602 participants were selected randomly from both education levels, 50% students from intermediate school and 50% students from high school. Students were informed about the purpose of the study and SDQ questionnaire.

The tools used in the present study to collect the information from the students were a structured standardised questionnaire includes the basics characteristic, demographic and consumption of energy drinks related information. Second strengths and difficulties questionnaire was a self-administered, standardised and structures to gather the information about the total difficulties and hyperactivity symptoms by using five subscales.

SDQ scale has been used as a tool in various studies for child mental health and validated for internal consistency.^{10,11}

Hyperactivity subscale of SDQ questionnaire was having 5 items used to analyse the inattention symptoms related to consumption of energy drinks and each item representing to answer: not true, somewhat true or certainly true coded as 0, 1 and 2 respectively for the first 3 items and reverse coded for last 2 items. The guidelines for the scores: between 0-5 normal, 6 borderline and 7-10 abnormal.¹² In this study, the outcome of the hyperactivity subscale score between 0-5 considered as normal and combining of borderline and hyperactivity category analysed together as at risk category for hyperactivity symptoms.

After completion of data collection, data were coded and validated. Data entry and analysis were conducted by using IBM SPSS version 22.0. Statistical analysis used frequencies, mean, standard deviation, chi-square tests to get the expected results. Logistic regression also applied with 95% confidence interval with odd ratio to observe the risk associated with energy drink at the 5% of significance level. This work has an approval with the King Khalid University, College of Medicine Ethical Committee.

RESULTS: Total sample included 602 students from intermediate and high school represented 300 (49.8%) male and 302 (50.2%) female students in both study level. 53.7% students were from intermediate and 46.7% students participated from high school. Majority of students (79.1%) lived in nuclear family (Table 1).

Variables	Total Sample (N=602) N (%)	Hyperactivity Subscale		p-value*
		Normal Range (0-5) N (%)	Range at risk (6-10) N (%)	
Gender				0.162
Male	49.8(300)	82.7(248)	17.3(52)	
Female	50.2(302)	78.1(236)	21.9(66)	
Nature of family				0.351
Nuclear	79.1(476)	79.6(379)	20.4(97)	
Extended	20.9(126)	83.3(105)	16.7(21)	
Nature of sleep				0.000
Irregular	46.5(280)	68.9(193)	31.1(87)	
Regular	53.5(322)	90.4(291)	9.6(31)	
Smoking habit				0.048
Smoker	9(54)	68.7(37)	31.5(17)	
Ex-smoker	3.2(19)	73.7(14)	26.3(5)	
Non-smoker	87.9(529)	81.9(433)	18.1(96)	
Behaviour and practices related to health				
I do not use seat belt	45.2(272)	76.5(208)	54(23.5)	0.028
High speed car driving	14.5(87)	73.6(64)	19.5(23)	
I carry weapon	7.8(47)	80.9(38)	19.1(9)	
Violence with other	4.3(26)	69.2(18)	5.1(8)	
Consumption of energy drink				0.000
Yes	50.3(303)	73.6(223)	26.3(80)	
No	49.7(299)	87.3(261)	12.7(38)	
Knowledge about the contents of drink (Yes)				
Sugar	81.1(506)	80.4(407)	19.6(99)	0.959
Caffeine	50.5(304)	80.3(244)	19.7(60)	0.933
Salt and Minerals	15.8(95)	73.7(70)	26.3(25)	0.072
Carbon dioxide	33.6(202)	81.2(164)	18.8(38)	0.729
Citric acid	26.4(159)	83.6(133)	16.4(26)	0.229
Nicotine	7.1(43)	86.0(37)	14.0(6)	0.333
Ethyl alcohol	18.1(109)	82.6(90)	17.4(19)	0.522
Taurine	6.5(39)	79.5(31)	20.5(8)	0.891
Stimulant compounds	38.5(233)	80.6(187)	19.4(45)	0.92
Type of energy drink (yes)				
Red Bull	66.4(202)	70.6(72)	29.4(30)	0.304
Power Horse	17.1(52)	69.2(36)	30.8(16)	0.423
Bison	50.7(154)	75.3(116)	24.7(38)	0.510
Bugzy	18.8(57)	66.7(38)	33.3(19)	0.182
Code Red	88.8(270)	73.3(198)	26.7(72)	0.695

Table 1: Characteristics of Sample by SDQ Hyperactivity Subscale Category

*Chi square statistics at 5% significance (p<0.05).

Prevalence of the energy drinks consumption among students studying in intermediate and high school level was 303 (50.3%). Male 162 (53.3%) are more consuming energy drinks than female 141 (46.7%). Students who are studying

in high school (56.1%) drinking more energy drinks than students (43.9%) in higher level.

Code Red brand of energy drink is more popular among male students (93.9%) than females (83%).

Majority of the students (42%) were consuming energy drinks daily. One bottle of any type of energy drink consumed by most of the students (37.2%). One fourth of the total participants started to drink the energy drinks at home. Majority of the students 246 (41.5%) were consuming the energy drinks because of its taste.

SDQ scale was analysed to know the difficulty level and assess the hyperactivity symptom. Mean score of SDQ was 21.53±5.414 falling in abnormal category. Most of the students 239 (39.7%) experienced minor difficulty to perform daily activities. More than half of the students 180 (56.8%) felt the difficulty more than one year.

Mean±SD score of the hyperactivity subscale of the SDQ was 3.76±1.980. Majority of the students 484 (80.4%) scored within normal range of hyperactivity subscale whereas 118 (19.6%) students scoring at risk category of hyperactivity/inattention subscale.

Eighty (67.8%) students who consumed energy drinks are more likely to score under risk category of hyperactivity subscale compared to those 38 (32.2%) who did not consume.

Consumption of Energy Drinks by Demography, Knowledge and Types of Drinks: Female students 66 (21.9%), p=0.162 are more likely to score hyperactivity subscale compared to male students 52 (17.3%) (Table 1).

Majority of students 476 (79.1%) were living with mother and father. Nearly, half of the students 280 (47.5%), p=0.000 were showing irregular sleep.

Most of the students 81.1% were aware of sugar as contents in energy drinks. About half of the students (50%) knew about the caffeine. Only few students were aware about nicotine and taurine, which are known to have addictive effects.

Majority of the students (88.8%) used to consume Code Red and 66.6% Red Bull and few students used to consume Power Horse and Bugzy types of energy drinks. This may indicate the difference in taste or stimulant effects after consumption.

Consumption of Energy Drinks and its Association with Hyperactivity/Inattention: Bivariate logistic regression analysis (Table 2) revealed that there was a significance association found with risk of hyperactivity/inattention (OR=2.47, 95% CI=1.61, 3.78) who consumed energy drinks. Hyperactivity risk was also associated with gender, smoking and students who were living with family and friends. Most of the types of energy drinks types were associated with hyperactivity as regression analysis results shown. No association observed with study level.

Variables	Odds Ratio (95% Confidence Interval)
Gender (Male vs. Female)	1.334 (0.890-10999)
Nature of family (Nuclear vs. Extended)	0.781 (0.465-1.313)
Smoking (Yes vs. No)	1.449 (1.074-1.957)
Study level (Intermediate vs. High school)	0.910 (0.990-1.047)
Living with (Family vs. Friends)	4.128 (0.256-66.486)
Consumption of energy drinks (Yes vs. No)	2.464 (1.610-3.771)
Types of energy drinks	
Red Bull (Yes vs. No)	1.296 (0.693-2.424)
Power Horse (Yes vs. No)	1.198 (0.562-2.555)
Bison (Yes vs. No)	0.799 (0.468-1.365)
Bugzy (Yes vs. No)	1.536 (0.793-2.959)
Code Red (Yes vs. No)	0.525 (0.057)- 4.792)
Boom Boom (Yes vs. No)	1.131 (0.124-10.292)
Monster (Yes vs. No)	1.992 (0.167-23.707)
Cran Energy (Yes vs. No)	2.129 (0.095-47.932)

Table 2: Bivariate Regression Analysis of Hyperactivity/Inattention Risk with Consumption of Energy Drinks

	Male (n=135)	Female (n=182)	p-value
Period of having difficulties in concentration and emotions			0.001*
Less than one month	6.7 (9)	57.4 (182)	
1-5 months	17.8 (24)	23.6 (43)	
6-12 months	14.1 (19)	8.8 (16)	
Over a year	61.5 (83)	53.3 (97)	
Difficulties making upset and distress			0.678
Not at all	28.9 (39)	23.6 (43)	
Only a little	40.7 (55)	45.1 (82)	
Medium	17.8 (24)	16.5 (30)	
A great deal	12.6(17)	14.8 (27)	

Table 3: Period of Having Difficulties in Concentration and Emotions Among Gender (n=317)

* p<0.05 = statistically significant.

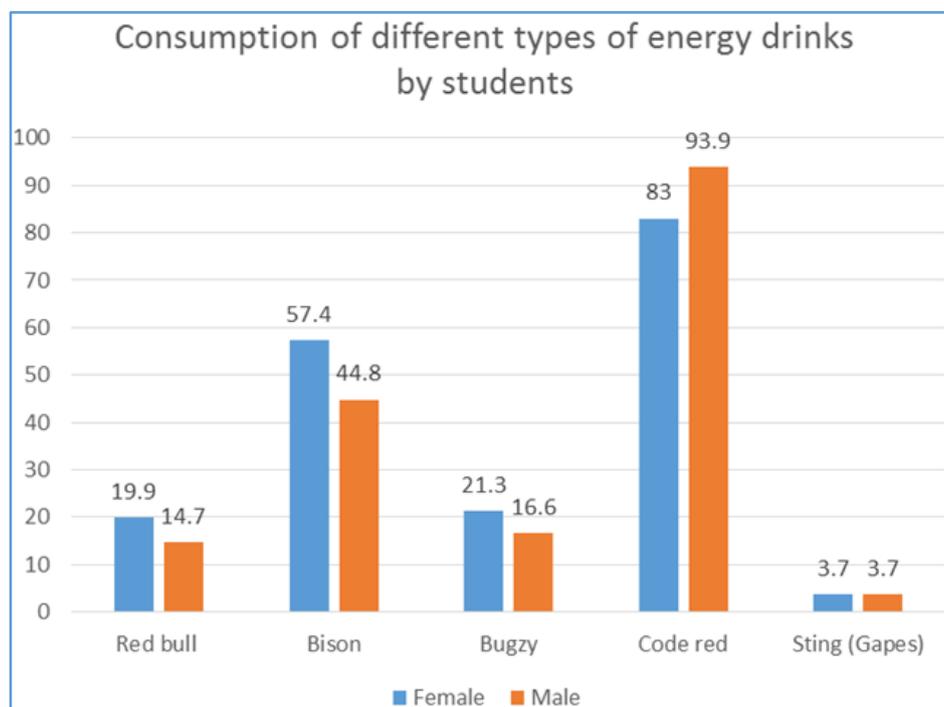


Figure 1: Consumption of Different Types of Energy Drinks by Students

DISCUSSION: Pattern of consumption of energy drink among male and female were seen different in this sample. Male students were consuming more energy drinks compared to female whereas high school students used to drink more than intermediate. Like other studies, males reported greater energy consumption compared to females.¹³ Our findings suggest low study level students were consuming more energy drinks than higher level of study. The study results showing that Code Red, Red Bull and Bison were most commonly brand of energy drinks used and students were more aware of sugar, caffeine, stimulants compound and carbon dioxide contents in energy drinks as other studies showing the energy drinks contains large amount of caffeine, sugars and other compounds acting synergistically.¹⁴

Association between energy drinks and hyperactivity/inattention symptoms and difficulty in performing daily activities have been established in previous studies.^{15,16} Results of our study showing 67.8% students reported who consumed energy drinks were more likely to score at risk category of hyperactivity compared who did not consumed the energy drinks after adjustment of potential confounder like types of energy drinks. Types of energy drinks in our results were associated with hyperactivity except Red code and Bison brand of energy drinks as it has been seen similar in other studies.¹⁷

The main reason for consuming energy drinks was due to its taste, the findings compared with the study done in nearby countries of Saudi Arabia as our findings contradicting the belief of the people who thought it increases the physical power.¹⁸ More studies need to done on association of hyperactivity due to energy drinks in respect of amount of drinks, types and frequency, etc.

CONCLUSION: Energy drinks consumption among students of Abha City studying in high school and intermediate has been seen very high. It accelerates the urgent need of effective health promotion strategies for the educational institutions and health program and camps should be conducted to make aware of students, parents and community about the potential risk of energy drinks on health. To prevent the sale of energy drinks near the school premises and canteen may help to reduce consumption. Information about the contents, nutritive value and health risk caused by energy drinks should be incorporated in the curriculum of students. The sugar contents are very high in energy drinks may lead the risk of weight gain increase the prevalence of obesity as non-communicable disease in Saudi Arabia need regular and effective health campaign. Health authorities of Saudi Arabia Government can play very vital role in executing the health campaign and may direct the drinks manufacturing companies label warning information on bottles of energy drinks.

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