

4th year MBBS Students: Knowledge and Practice for Energy Drinks Consumption and their Side Effects

MEHWISHARIF¹, RAFIA HUSSAIN², AAVEZA NAZIR³, AHMAD ZUNAIR WASIM⁴, ABDUL REHMAN KHAN⁵, KHAYYAM ARIF⁶, MUHAMMAD MUNEEB⁷

ABSTRACT

Background: Energy Drinks (E.Ds) are famous for being instant source of energy and symbolize fashion. EDs are used for a number of reasons depending on school of thought and desired effect. It is very important that medical students should know about ED's side effects and their attitude towards EDs.

Aim: To assess the knowledge and practice of fourth year medical students about Energy Drinks consumption and its side effects.

Study Design: A descriptive cross sectional study was conducted among 4th year MBBS students of Lahore Medical & Dental College (LMDC) in January, 2018.

Methodology: Medical students of fourth year MBBS were invited to participate in the study after obtaining voluntary informed consent from the respondents. A structured questionnaire was used as the study tool to obtain socio-demographic background of students as well as their knowledge and practices regarding Energy Drinks consumption and their potential side effects. Data was entered, cleaned and analyzed in SPSS 20. Data was presented in the form of tables and graph and was analyzed through descriptive statistics.

Results: Study participants (n=104) included 42.3% males and 57.7% females. 100% of the students knew what an ED is, but the sources of information were found to be varied. Majority of participants knew that Caffeine (79.8%), Taurine (34.6%) and Sugar (54.8%) are basic ingredients of ED. 58% respondents were of the opinion that generally ED are used to stay awake. 34.6% of participants believed that EDs can cause fatigue, dehydration 26%, increase heart rate 45.2%, Insomnia 40.4%, 78.8% of respondents have never used EDs

Conclusion: A considerable majority of the medical student consume energy drinks mainly inspired by friends, for the purpose of studying and staying awake. They have only the basic knowledge about its composition and side effects mainly acquired through internet and television.

Keywords: Energy Drinks (EDs), medical students, knowledge, practice, Side Effects.

INTRODUCTION

Energy Drinks (EDs) were introduced for the first time in the 1960s in the regions of Europe and Asia. But it became very popular after the launch of energy drink named as "Red Bull" in 1997. There are 500 brands of Energy Drinks in world¹. Energy Drinks have become very popular in last 15 years of time; around 1% of total beverages market is Energy Drinks. In couple of years in Europe, Energy Drinks market has grown up by 13%^{2,3}. Global consumption of Energy Drinks has increased from 1.5 Billion liters in 2007 to 4.8 Billion liters in 2011 with a 10% of growth each year⁴.

Energy Drinks claim to provide instant energy, reduce fatigue, wakefulness and stimulates the brain activity⁵. Energy Drinks contain stimulant drugs mainly caffeine and it is meant to stimulate mental activity but drinks like Coffee, tea, cola etc. which contains caffeine are not listed as energy drinks⁶. Caffeine is found naturally in some leaves, seeds etc. of 60 different plants and these minor sources of caffeine are found have stimulating effect on Central Nervous System (CNS). Main Ingredients of Energy drinks generally contain methylxanthines (including caffeine), taurine, glucuronolactone, B Vitamins, herbs, carbonated water, guarana, yerba mate, acai, and taurine. They can be responsible for the possible side effects of energy drinks⁷. Caffeine content in Energy Drinks is found to be too high and not regulated as compared to other beverages (150-300%)⁸.

Demonstrator, Department of Community Medicine, Lahore Medical & Dental College (LMDC), Lahore, Pakistan
PG trainee community medicine, Lahore Medical & Dental College, 4th year MBBS student, Lahore Medical & Dental College (LMDC), Lahore, Pakistan.

*Correspondence to Dr. Mehwish Arif,
E mail: mehwish.arif@lmdc.edu.pk, Cell: 03006286542*

Several studies have revealed the use of Energy Drinks is mainly found in youngsters and Adolescents. Athletes are also found using such drinks. Age of most users is from 18 to 25^{9,10}. Energy Drinks are used by youngster due to several different reasons; for long driving, partying, studying and to stimulate brain activity. However these claimed benefits have several physical and physiological adverse effects on human body^{11,12}. Caffeine use is not recommended for children and pregnant women whereas use of Caffeine as stimulant for brain activity and memory are controversial and not very obvious in longer run¹³. Excessive use of caffeine can cause several problems to human body like headache, reduced insulin sensitivity, Cardiovascular, CNS, gastrointestinal, renal dysfunction¹⁴. In some severe cases deaths are reported having possible cause of excessive Energy Drink use which lead to restriction on Energy Drinks in some countries¹⁵.

As the future health care providers, the medical students must be well aware of the composition and the potential side effects of EDs on human health. This study has been conducted to assess the awareness and practice of Energy Drinks consumption among medical students.

METHODOLOGY

A descriptive cross sectional study was conducted among 4th year MBBS students of Lahore Medical & Dental College (LMDC) in January, 2018. A structured questionnaire was used to obtain socio-demographic background of students as well as their knowledge and practices regarding Energy Drinks consumption and its Side Effects on Health. Data was entered, cleaned and analyzed in SPSS 20. Data was presented in the form of tables and graph and was analyzed through descriptive statistics. The study was conducted after approval from LMDC's Institutional Review Board. A verbal- informed

consent, from the study participants was obtained for data collection and publication.

RESULTS

Background of Respondents: The analysis was performed using SPSS 20. The analysis included **104** undergraduate students from the selected private medical college in Lahore. Study participants included 42.3% males and 57.7% females. More than half (65.4%) students were day scholars and others live in hostel. Fathers of more than half (70.2%) of the students were non-doctors and mothers of only 15.4% students were doctors (Table 1).

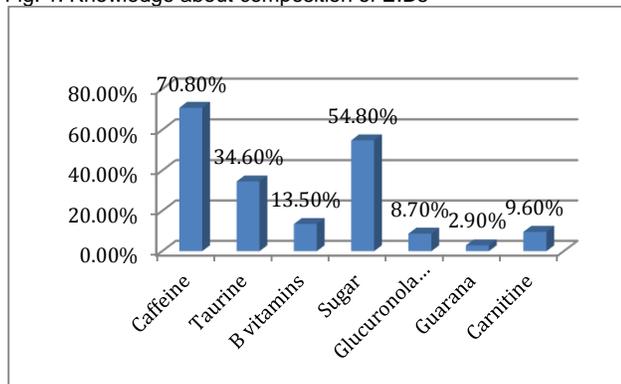
Table 1: socio-demographic Background of Respondents

Factors	n%
Gender	
Male	44(42.2%)
Female	60(57.7%)
Residential status	
Stay in Hostel	36(34.6%)
Day Scholar	68(65.4%)
Pre-entry qualification	
F.Sc	78(75%)
A-Level	25(24%)
American Board	1(0.96%)
Father's Occupation	
Doctor	31(29.8%)
Non-Doctor	73(70.2%)
Mother's Occupation	
Doctor	16(15.4%)
Non-Doctor	88(84.6%)

Table 2: Knowledge about major effects of Energy Drinks

Factors	Yes	No
Increase physical strength	26(25.0%)	78(75.0%)
Increase brain concentration	39(37.5%)	65(62.5%)
Help to keep awake	61(58.7%)	43(41.3%)
Stimulate metabolism	26(25.0%)	78(75.0%)
Other effects	2(1.9%)	102(98.1%)
Don't know	1(0.96%)	103(99.04%)

Fig. 1: Knowledge about composition of E.Ds



Knowledge about EDs: 100% of the students (n=104) knew what an ED is. Different **Sources of information about EDs** were reported; as 32.7% through friends, 51.0% advertisements, 39.4% social media, 15.4% beverage store and 1.9% other sources. Knowledge of participants was checked about basic ingredients of EDs and the results are shown in Figure 1. Most participants knew that Caffeine, Taurine and Sugar are basic ingredients. Student's perceptions about the major effects of EDs were increased

physical strength 25.0%, increased brain concentration 37.5%, help to keep awake 58.7%, stimulate metabolism 25.0% and other effects 1.9% (Table 2).

The major side effects/withdrawal effects of EDs consumption were asked. 34.6% of participants believed that EDs can cause fatigue, dehydration 26%, increase heart rate 45.2%, increase blood pressure 18.3%, tremors 13.5%, insomnia 40.4%, muscle stiffness and aches 8.7%, nausea and vomiting 17.3%, abdominal pain 11.5%, inability to focus 22.1%, headache 42.3% and dental caries 22.1%. 3.8% students think that there are no adverse or withdrawal effects (Table 3)

According to respondents **the best sources of information about EDs** are TV 49.0%, billboards 8.7%, friends/relatives 18.3%, print material 4.8% and internet 54.8%. 1.9% didn't know about what the sources could be. 57.7% (60 students) think consuming EDs is a symbol of fashion or high-class status.

Table 3: Source of Information about EDs

Factors	Yes	No
Television	51(49.0%)	53(51.0%)
Billboards	9(8.7%)	95(91.3%)
friends or relatives	19(18.3%)	85(81.7%)
print material	5(4.8%)	99(95.2%)
Internet	57(54.8%)	47(45.2%)
Other	0(0%)	100(100%)
Don't know	2(1.9%)	102(98.1%)

ED Consumption Patterns and Reasons: Among surveyed undergraduate students, **78.8% reported ever consuming EDs**. Red bull was the most consumed ED by 52.9%, followed by Sting 38.5%, monster 12.5%, rock star 1.9%, and others 4.8%. 53.8% respondents preferred sugared EDs while 26% prefer to use Sugar Free EDs.

Table 4: Consumption Pattern of EDs

Energy Drink	Yes	No
Monster	13(12.5%)	69(66.3%)
NOS	0(0%)	82(78.8%)
Red Bull	55(52.9%)	27(26.0%)
Sting	40(38.5%)	42(40.4%)
Rock-Star	2(1.9%)	80(76.9%)
Others	5(4.8%)	77(74.0%)
All Types of EDs	2(1.9%)	80(76.9%)

The mean age of the first ED drinking was and 62% of ED 16.7+ 7.342 years users had their first ED before 18 years old. The major inspiration/**reason for consuming** their first ED was friends 33.7%, curiosity 18.3%, and advertisements 4.8%. 25.0% respondents had no particular reason for ED use.

Table 5: Inspiration for first time use of EDs

Factors	Yes	No
No particular reason	26(25.0%)	56(53.8%)
Friends	35(33.7%)	47(45.2%)
Advertisement	5(4.8%)	77(74.0%)
Curiosity	19(18.3%)	63(60.6%)
Other	0(0%)	82(78.8%)

The analysis showed that 26.9% respondents drink EDs without any special occasion, 8.7% consumed during sports, 28.8% during studying, during exams 25.0%, and 5.8% at parties. Only 1 respondent (0.96%) consulted any health professional before consuming ED.

Fig. 2: knowledge about adverse effects of EDs

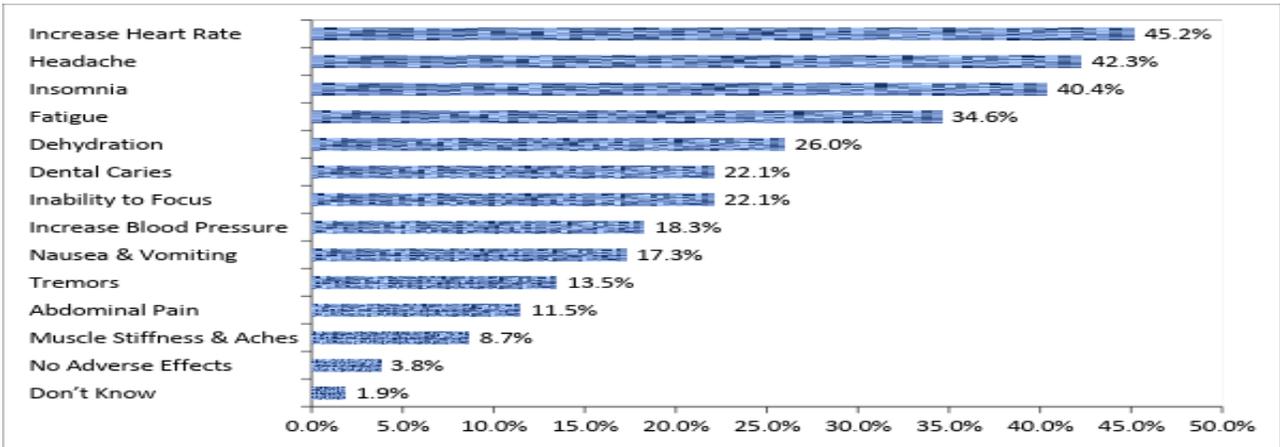
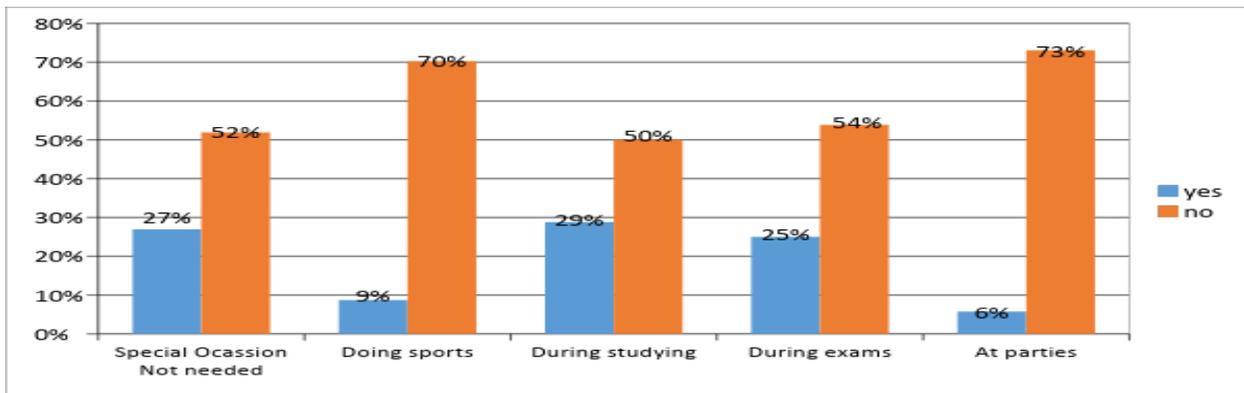


Fig.3: Occasion for EDs consumption



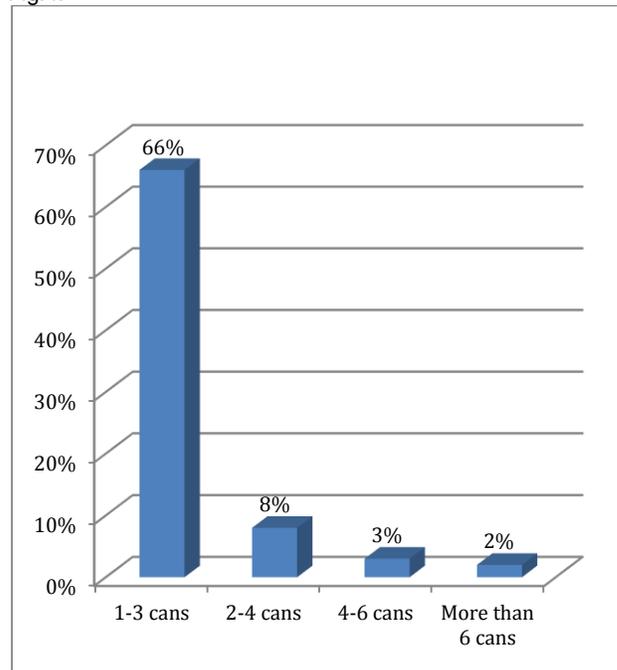
On an average, 5.8% of users consumed ED daily, 8.7% 3-5 times per week, 8.7% 1-2 times a week, 10.6% 2-4 times a month, and 45.2% less than one time per month. 66.3% usually drink 1-3 cans per week, 7.7% drink 2-4 cans, 2.9% drinks 4-6 cans and 1.6% drinks more than 6 cans.

The study showed that 50.0% users experienced insomnia, followed by palpitations/tachycardia 31.7%, weight gain 10.6%, and neuropsychosis 2.9%. Only 4 respondents (3.8%) consulted health professional after experiencing any side effects. Out of all the ED users 15 (14.4%) recommended others to take energy drinks.

Table 6: Experienced Adverse Effects of EDs Consumption

Factor		Yes	No
Have you ever experienced any of the following after taking EDs?	Weight gain	11(10.6%)	71(68.3%)
	palpitations or tachycardia	33(31.7%)	49(47.1%)
	Insomnia	52(50%)	30(28.8%)
	Neuropsychosis	3(2.9%)	79(76.0%)
	Other	0(0%)	82(78.8%)
Did you consult any health professional after experiencing any of above mentioned effects of EDs?		4(3.8%)	78(75.0%)
Have you ever recommended others to take EDs?		15(14.4%)	67(64.4%)

Fig.4:



DISCUSSION

Energy drink is a rapidly flourishing trend in beverage industry. Born in Australia year 1987 and thereafter a decade in the United States, their consumption and supply has increased exponentially. 500 new brands worldwide in 2006 supplemented by 200 more in year 2007 in the United States clearly shows the rampant increase in the consumers in the society^{[16][17][18]}. However in Pakistan this trend is catching up where consumption of tea and soft drinks has always led the market. Red bull is the pioneer of energy drinks in Pakistan but now sting has also emerged as a tough competitor due to easy availability and low cost. The adverse effects have long been debated about and various researches available internationally but in our local settings these have been understudied. With the youth majorly targeted, our concern for the medical students as the future health professionals and also as role models to the society, their knowledge and practice regarding energy drinks cannot be undermined.

In our study all of the respondents knew what an energy drink was and their major sources of knowledge were advertisements, internet and friends as were in the previous similar studies^[19]. The extra boost of energy provided by the energy drinks is attributed to the combination of stimulants they contain including caffeine, herbal extracts such as guarana, B vitamins, amino acids such as taurine, amino-acid derivatives as carnitine, and sugar derivatives, including glucoronolactone and ribose^[20]. According to our results most of the respondents were sure about caffeine, sugar and taurine as the major ingredients of the energy drinks but little knowledge they had about guarana, glucoronolactone and carnitine.

Marketing of Energy drinks thrives on their stimulatory effect. A wide variety of benefits including physical endurance, enhanced concentration and memory recall, decrease sleep, increase ability of decision making enhanced athletic performance are claimed. Although low doses of caffeine 12.5 to 50mg have been found to improve cognitive performance and mood^[21] and 200mg is known to enhance cognitive task speed and task accuracy with marked improved alertness in young adults^[22]. The amount of caffeine present in energy drink is much higher than that necessary to improve cognitive functioning^[23]. When the knowledge regarding the effects of ED was assessed, majority (58%) respondents were of the opinion that generally ED are used to stay awake. Increased brain concentration, increased physical strength and enhanced metabolism are the other reasons of mutually of equal importance for the use of ED.

Knowledge about the side effects and withdrawal effects shows that the respondents were of the view that increased heart rate, headache and insomnia are major side effects of EDs, while dehydration, fatigue, inability to focus and dental caries were also important but less frequent ones. All these results were found consistent with the past studies.

Contrary to the previous similar study among medical students, 57.7% of the individuals were of the view that ED consumption is a symbol of fashion and high class status¹⁹.

Our study reveals 78.8% frequency of energy drink consumption among our respondent medical students (approximately 3/4th of the total sample). It is nearly twice than the prevalence expected from the previous studies^{24,25}. Red bull energy drink is reportedly a "functional beverage" that was designed to increase physical and mental performance²⁶. And hence are rightfully successful in the promotion for the product, as the results of our study show that out of all the available energy drinks Red bull is the most commonly consumed one, second being the Sting. Despite the awareness of presence

and ill effects of high sugar content the students, preferred consuming sugared energy drinks over the sugar-free ones.

Nowadays energy drink manufacturers target the teenage population and the young adults (18-34 yrs)²⁷ and the trend can be clearly seen in USA where 34% of the aforementioned population consume energy drinks on regular basis^{28,29}. Similarly our study showed the mean age of 16.7+7.342 years at which the ED users first started to take ED and almost 62% of the users had it before 18 years of age. Peer pressure has always been a vital factor for acquiring hazardous habits in colleges and universities. According to our study, the main inspiration for the first time use of ED was friends and acquaintances of the users.

As expected in the study population of medical students whose main focus is on studies, the major occasions for the use of E.D were studying and during exams rather than sports or parties. However there is a comparable frequency of those who do not need any special occasion for the use. Moreover despite easy access and availabilities of health professionals in medical college, only one respondent considered it worthy of an important subject to discuss with the health professional before the start of ED consumption.

The basic pattern of consumption among users is very much coherent. Majority of the users take it less than one time a month consuming only 1 to 3 cans per week, which is quite less as compared to the previously done similar studies^[19] where the users have one drink daily.

As expected from the previous studies, insomnia and palpitations clearly stood out in the results when inquired about the adverse effects experienced due to ED consumption^{[24][30][16]}. However weight gain was only present in only 10.6% of the sample which is in contrast to the previous studies where weight gain was reported by overwhelming majority of users. But when interviewed for the concern about these side effects, only negligible percentage 3.4%, ever consulted a health professional for their management.

Keeping under consideration the adverse effects 67.7% majority of the users considered the consumption of ED neither safe nor useful enough to be suggested to others.

CONCLUSION

A considerable majority of the medical student consume energy drinks mainly inspired by friends, for the purpose of studying and staying awake. They have only the basic knowledge about its composition and side effects mainly acquired through internet and television.

Recommendations: Medical students as the future health professionals should be well abreast with the composition and side effects of energy drinks, so it should be made a part of the nutrition section of the curriculum. Regular assessment of the knowledge and practices among the medical students should be done. Recommendations for further studies are to include the knowledge and practice of the tea, coffee and cola drinks consumption as these are also stimulants and are more commonly used. Hence their synergistic effect should also be studied. Sleep hygiene awareness should be promoted so the root cause of use can be addressed.

Limitations: The results cannot be generalized as the study sample is not the true representative of all the medical students of Pakistan.

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