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Consumption of Energy Drinks and its Association with its Adverse Effect among Medical Students: A Correlational Study

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Abstract

Background and objective

Energy drinks (ED) are refreshments with fortified nutrition. In 1987 Austria, Red Bull was first introduced and their usage was continuously increased. From the day of its origin, the popularity of energy drinks has increased aggressively, as 500 new brands were launched in 2006 globally. Sales of these energy drinks have increased 240% between 2004 and 2009. This study was designed to determine association of consumption of energy drinks with its adverse effect among medical students.

Methods

This study was conducted at Aziz Fatimah Medical and Dental College Faisalabad. The study was conducted in 6 months after approval from Institutional Education Committee with ERC no IEC/138-21. The data was retrieved from Google forms. Frequency was obtained from the data and for the qualitative analysis; we applied the Karl

Pearson coefficient of correlation and P-value <0.05 was considered significant.

Results

In this study, questionnaire was shared among the 250 students but only 237 completed responses were received. Out of 237, there were 164(69.2%) females and 73(30.8%) were males. It was found that out of 237 samples, students using energy drink were 156(65.8%). Sting was the most consumed brand in our study with the frequency of 113(72.4%) out of 156 students. Students who consume energy drinks think that it helps them to concentrate, decrease tiredness, reduce headache, improve mood and help them to stay awake with a positive correlation.

Conclusion

A significant relationship was observed among ED consumers with the different side effects.

Keywords: Energy Drinks, Medical Students, Adverse Effects

Introduction

Energy drinks (ED) are refreshments with fortified nutrition. In 1987 Austria, Red Bull was first introduced and their usage was continuously increase. Since then the market has been flooded with numerous brands. Some of the common Energy drinks ingredients are Caffeine, Herbal extracts, Sugar derivatives and Amphetamine^[1].

From the day of its origin, the popularity of energy drinks has increased aggressively, as 500 new brands were launched in 2006 globally. Sales of these energy drinks have increased 240% between 2004 and 2009. Until now, rapid growing products in this industry are energy drinks^[2]. ED can, of 8 floz (ca. 240 mL), will provide 21–34 g, or even 50–60 g, of glucose, which causes obesity and dental caries^[3].

In Pakistan consumption of Caffeine is rising regularly among medical students. The competition in the medical field and the hard work has increased the utilization of caffeine by medical students so as to be performing better for more hours with increased level of concentration^[4]. 90% of caffeine taken through a coffee cup is digested from stomach after 20 minutes. This caffeine shown its effects after an hour and its effects will persist for 3-4 hours^[5].

Most common harmful effects with elevated dosage of drinks were hallucination, seizures, GI upset & cardiac ischemia caused by sympathetic over stimulation. More consumption of caffeinated energy drinks is causing neural, renal, gastrointestinal and cardiovascular function deterioration [1]. In addition to this, 500-600 milligrams or more intake of this caffeine may cause nervousness, insomnia, muscle tremors and restlessness. 12-24 hours will require showing withdrawal symptoms after abstinence and with highest intensity around 20-51 hours and may persist for a week or so [4].

Reported side effects with elevated levels of these drinks were hallucination, GI upset, seizures & cardiac ischemia caused by sympathetic over stimulation. Increase intake of caffeine-containing drinks also is associated with chronic daily headaches, renal, neural dysfunctions [1].

Medical student's dependence on caffeine is very common and is growing at dangerous speed. ED daily consumption is increasing because they will enhance alertness and decrease gaps in attention. In Pakistan, medical students have a number of choices from, such as tea, coffee, soft drinks, caffeine tablets and patches. The energy drink market consumption is growing every year. Also, a limited number of publications have been reported the adverse effects associated with the use of energy drinks. This study was designed to determine association of consumption of energy drinks with adverse effect among medical students.

Methodology

The study was conducted at Aziz Fatimah medical and Dental College Faisalabad. This study was conducted in 6 months after approval from Institutional Education Committee with ERC no IEC/138-21 from August to January 2021. In this study self-structured questionnaire was constructed on the Google forms and sent among participants by using non-probability convenient sampling. Consent was taken from the participants in the first section of the questionnaire while second section comprised of the questions related to demographic data and the questions related to the study were included in the third section of questionnaire. The link of this questionnaire was shared among the students of AFMDC Faisalabad. The data was retrieved from the individual response from the Google form and converted to the SPSS version 25 for analysis. Frequency was obtained from the data and for the qualitative analysis; we applied the Karl Pearson coefficient of correlation and P-value <0.05 was considered significant.

Results

In this study, Whatsapp link of questionnaire was shared among the 250 students but only 237 completed responses were received. Out of 237, there were 164(69.2%) females and 73(30.8%) were males. Fig 1 showed the distribution of the students according to their academic years, this showed that most of the participants were from 4th year, followed by 3rd year and then final year, 2nd year and first year

respectively.

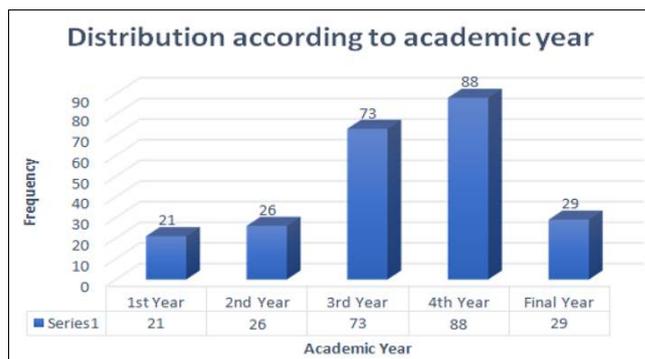


Fig 1



Fig 2

Fig 2 showed that out of 156 energy drink users, those who have started to drink energy drink from last one year are 24(15.4%), and 45(28.28%) are those who are using from 1-3 months. 37(23.7%) and 50(32.1%) are those who are using from 3-6 months and for more than 1 year respectively.

In this study, it was found that out of 237 samples, students using energy drink were 156(65.8%) and remaining students were not involved in energy drink consumption. Only Sting was the most consumed brand in our study with the frequency of 113(72.4%) out of 156 students. The second most in this category was Red Bull which was consumed by 17(10.9%) students. Boost, Roar and Monster were used by 6(3.8%), 3(1.9%) and 1(0.6%) respectively as shown in table no 1. Remaining students were using 2 or more than 2 brands.

Table 1: Frequency of Consumption of different brands of Eds

| Brands of Energy drink | Frequency | Percentage (%) |
|---------------------------------|-----------|----------------|
| Sting | 113 | 72.4 |
| Red Bull | 17 | 10.9 |
| Boost | 06 | 3.8 |
| Roar | 03 | 1.9 |
| Monster | 01 | 0.6 |
| Using two or more than 2 brands | 16 | 10.3 |
| Total | 156 | 100 |

Table 2: Measurement items for energy drink consumption

| Variable | ED Consumption | 1 (SD) | 2 (D) | 3 (N) | 4 (A) | 5 (SA) | Mean | Standard Deviation | P-value |
|-----------------------------|----------------|--------|-------|-------|-------|--------|------|--------------------|---------|
| It helps me when I am tired | No (81) | 37 | 12 | 19 | 07 | 06 | 2.17 | 1.30 | 0.000 |
| | Yes (156) | 21 | 30 | 61 | 30 | 14 | 2.90 | 1.13 | |
| It helps me to concentrate | No (81) | 38 | 14 | 17 | 08 | 04 | 2.08 | 1.24 | 0.000 |
| | Yes (156) | 24 | 34 | 63 | 24 | 11 | 2.77 | 1.11 | |
| It reduce my headache | No (81) | 40 | 11 | 20 | 06 | 04 | 2.05 | 1.22 | 0.000 |
| | Yes (156) | 30 | 38 | 58 | 19 | 11 | 2.63 | 1.14 | |
| Improves my mood | No (81) | 37 | 06 | 21 | 11 | 06 | 2.30 | 1.36 | 0.000 |
| | Yes (156) | 23 | 24 | 56 | 42 | 11 | 2.96 | 1.14 | |
| Helps me to stay awake | No (81) | 34 | 14 | 15 | 11 | 07 | 2.30 | 1.36 | 0.000 |
| | Yes (156) | 25 | 26 | 55 | 36 | 14 | 2.92 | 1.18 | |
| It help me while studying | No (81) | 36 | 12 | 23 | 06 | 04 | 2.14 | 1.21 | 0.000 |
| | Yes (156) | 30 | 44 | 43 | 29 | 10 | 2.65 | 1.17 | |

SD=Strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly agree

In our study, it was found that most of the students are consuming energy drink with the frequency of 65.8%. Students who consume energy drinks think that it helps them to concentrate, decrease tiredness, reduce headache, improve mood and help them to stay awake with a p-value of 0.000 which is statistically significant. In respect of physical and mental fitness, the energy drink consumers got

higher score with a statistically significant p-value 0.001. Higher score was achieved by ED consumers in respect of motivation for their work and while studying with a p-value 0.038 and 0.000 which are significant. ED users got higher scores thinking that it helps them at exercise with p-value 0.025.

Table 3: Expected adverse effects of energy drinks on health

| Variable | ED Consumption | 0 (N) | 1 (R) | 2 (S) | 3 (O) | 4 (A) | Mean | Standard deviation | P- value |
|--|----------------|-------|-------|-------|-------|-------|------|--------------------|----------|
| Any blurring of vision? | No (81) | 32 | 18 | 17 | 08 | 06 | 1.23 | 1.28 | 0.037 |
| | Yes (156) | 46 | 49 | 29 | 29 | 03 | 1.32 | 1.14 | |
| Have your thirst increased? | No (81) | 23 | 14 | 26 | 10 | 08 | 1.58 | 1.27 | 0.041 |
| | Yes (156) | 25 | 36 | 46 | 39 | 10 | 1.82 | 1.16 | |
| Have you experienced any tooth decay? | No (81) | 44 | 08 | 11 | 08 | 10 | 1.16 | 1.48 | 0.001 |
| | Yes (156) | 50 | 39 | 35 | 24 | 08 | 1.36 | 1.22 | |
| Do you feel any headache? | No (81) | 13 | 19 | 17 | 18 | 14 | 2.02 | 1.35 | 0.434 |
| | Yes (156) | 22 | 36 | 39 | 44 | 15 | 1.96 | 1.21 | |
| Did you experience any increase in heart beat? | No (81) | 17 | 12 | 23 | 20 | 09 | 1.90 | 1.30 | 0.048 |
| | Yes (156) | 22 | 44 | 50 | 33 | 07 | 1.73 | 1.08 | |

N=Never, R=Rarely, S=Sometimes, O=Often, A=Always

Discussion

This study was carried out to know the frequency of energy drinks use and its associated adverse effect among medical students of AFMDC Faisalabad. The study showed that 65.8% of the medical students of AFMDC were in habit of using energy drinks. This result is in close association with the study carried out in the Islamabad where 63.9% of students were using energy drinks [1]. Another study in the students of Bahrain revealed that only 30% are involved in EDs consumption while 70% were free from this habit [6]. Another study of Lebanon showed consumption rate of 77% [7]. Overall consumption rate of EDs was higher among students presented by many previous researches including our study.

The most common brand used by the participants of our study was sting which was followed by Red bull and then boost, roar and monster respectively. A previous study of Lebanon showed the most use of Red bull followed by other brands [7]. Another research done in Karachi also showed the popular consumption of Red bull followed by sting [8]. Red bull was also found popular in another research in Karachi [1]. The consumption of different brands was basically depending upon the availability and cost of ED in different areas.

In our study, it was found that most of the medical students have been using energy drinks for more than a year (32.1%) followed by the consumers from last 2-3 months (28.8%).

Then the participants who were consuming from 3-6 months (23.7%) and those using from 1 year (15.4%). Not much data came out to be compared in this regard. But an old study showed the routine of using EDs 2-3 times in a week or 4-7 times a week [9].

This study showed that students using EDs because it helps them to concentrate stay awake and reduces headache with p value of 0.000. A study conducted in Saudia also showed same result [10].

Our study showed that consumption of EDs can result in the change in mood, decreasing the headache and staying awake for long times which has decreased sleeping hours that was consistent with the previous finding. The study in Lebanon also reported difficulty in sleeping after consuming EDs [7]. Another study showed no such effects on ED consumption which is in contrast to our results [6]. A study was reported in prince Sattam Abdul Aziz university revealed the increase in the percentage of headache i.e 32.3% by the use of ED along with increased insomnia [11].

Our study also showed the increase ED usage to get motivation, study better and in turn can get good results. It was found in a study by Prince Sattam Abdul Aziz University that female consumed ED to perform better in exams [11].

The current study revealed the increase in Blood pressure and anxiety by use of EDs in consumers, but the results were not statistically significant. Our study also reported

increase in thirst, blurring of vision and problems of tooth decay in consumers of EDs. A study also showed that students also experienced insomnia and increase in thirst with use of EDs^[12]. Another study showed that 42.2% of participants were also experiencing the same problems after consuming EDs^[13]. The same results were found by a study, they revealed that there is 2.4 times increase in the tooth decay among ED users as compare to the non-users. They thought that ED resulted in the low pH (acidic) and increased sugar content among drinks both of which have a precipitating effect on the dentine destruction^[14]. In contrast to this; a study showed that only 6.3% of the students were experiencing any side effects^[15]. Another study was conducted and revealed that palpitation was the most observed side effect after EDs^[16].

Conclusion

A significant relationship was observed among ED consumers with the different side effects like blurring of vision, tooth decay, increase in thirst level etc. Reason for using ED was found to be study pressure and physical quality among medical students.

Limitation

Limited sample size and non-probability sampling were the limitations of this study. The results cannot be generalized as it was a single centered study.

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References

1. Babar NF, Amin A, Asif R. Prevalence and Perceived benefits of energy drink consumption in medical students. *Journal of Rawalpindi Medical College*. 2020; 24(1):46-50. Doi: <https://doi.org/10.37939/jrmc/vol24.iss1.10>
2. Nadeem IM, Shanmugaraj A, Sakha S, Horner NS, Ayeni OR, Khan M. Energy Drinks and Their Adverse Health Effects: A Systematic Review and Meta-analysis. *Sports Health*. 2021; 13(3):265-277. Doi: <https://doi.org/10.1177/1941738120949181>
3. Nowak D, Gośliński M, Nowatkowska K. The Effect of Acute Consumption of Energy Drinks on Blood Pressure, Heart Rate and Blood Glucose in the Group of Young Adults. *International Journal of Environmental Research and Public Health*. 2018; 15:544. Available from: <http://dx.doi.org/10.3390/ijerph15030544>
4. Hassan U. Frequency and awareness of caffeine consumption among the medical students. *Professional Medical Journal*. 2020; 27(12):2763-2768. Doi: <https://doi.org/10.29309/TPMJ/2020.27.12.4631>
5. Ahmad M, E Hinna R, Tayyab A. Knowledge and trends of caffeine consumption among medical and non-medical students of Lahore Pakistan. *Pak Journal of Neural Sciences*. 2017; 12(2):24-30.
6. Hussain M, Perna S, Mandeel Q, Naser J, Alalwan T. Awareness and consumption pattern of energy drinks among Bahraini youth. *Bahrain Medical Bulletin*. 2021; 43(2):423-430.
7. Dwaity J, Dwaity A, Hasan H, Kadry S, Balusamy B. Survey of energy drink consumption and adverse health effects in Lebanon. *Health Information science and systems*. 2018; 6(1):15.
8. Usman A, Bhombal ST, Jawaid A, Zaki S. Energy drinks consumption practices among medical students of a Private sector University of Karachi, Pakistan. *Journal of Pakistan Medical Association*. 2015; 65(9):1005-1007.
9. Alsunni A, Badar A. Energy drinks consumption pattern, perceived benefits and associated adverse effects amongst students of university of Dammam, Saudi Arabia. *Journal of Ayub Medical College Abbottabad*. 2011; 23(3):3-9.
10. Subaiea GM, Altebainawi AF, Alshammari TM. Energy drinks and population health: Consumption pattern and adverse effects among Saudi population. *BMC Public Health*. 2019; 19:1539. Doi: <https://doi.org/10.1186/s12889-019-7731-z>
11. Rahamathulla MP. Prevalence, side effects and awareness about energy drinks among the female university students in Saudi Arabia. *Pakistan Journal of Medical Sciences*. 2017; 33(2):347-352. Doi: <https://doi.org/10.12669/pjms.332.12084>
12. Scuri S, Petrelli F, Tesaro M, Carozzo F, Kracmarova L, Grappasonni I. Energy drink consumption: A survey in high school students and associated psychological effects. *Journal of Preventive Medicine and Hygiene*. 2018; 59(1):E75-E79. Doi: 10.15167/2421-4248/jpmh2018.59.1.898. PMID: 29938241; PMCID: PMC6009064.
13. Grech A, Axiak S, Pace L, Fondocarò DV. A survey of energy drinks consumption amongst medical students and foundation year doctors in Malta. *Malta Medical Journal*. 2019; 3(3):59-66.
14. Rupa G, Deepa G. Caffeinated energy drink consumption among First year medical students. *Journal of Medical Science and Clinical Research*. 2017; 5(3):18437-18443. Doi: <https://dx.doi.org/10.18535/jmscr/v5i3.27>
15. Borlu A, Oral B, Gunay O. Consumption of energy drinks among Turkish University students and its health hazards. *Pakistan Journal of Medical Sciences*. 2019; 35(2):537-542. Doi: <https://doi.org/10.12669/pjms.35.2.638>
16. Kulak E, Hidiroglu S, Lüleci N, Karavus M. Energy drinks consumption among pre-clinical medical students attending a public medical school in Istanbul, Turkey. *Marmara Medical Journal*. 2019; 32:71-77. Doi: 10.5472/marumj.570908.