UDC: 613.292:616.1/.8-053.6
Professional paper

THE IMPACT OF ENERGY DRINK CONSUMPTION ON HUMAN HEALTH: RISKS, BENEFITS, AND PUBLIC HEALTH CONSIDERATIONS

Nexhibe NUHII[1], Yllzana SINANI[1], Maida NEBIU[1], Jehona ÇANGA[1], Sanja LAZAROVA[1], Erda ALIU[1].

[1*]*Department of General Medicine, Faculty of Medical Sciences*
[*]*Corresponding author e-mail: nexhibe.nuhii@unite.edu.mk*

Abstract

This paper highlights the increase in the consumption of energy drinks, particularly among adolescents and university students. It aims to raise awareness of the health risks associated with excessive intake and evaluate both the positive and negative effects on the human body. Using statistical data and comparative tables, the study examines how energy drinks affect key systems such as the cardiovascular, renal, neurological and other systems. While short-term benefits like increased alertness and concentration may attract consumers, the potential harms are significant. The paper emphasizes the urgent need for improved public health education and stricter awareness around energy drink consumption

Keywords: energy drinks, stimulants, health effects, caffeine, youth consumption, public health awareness

1. Introduction

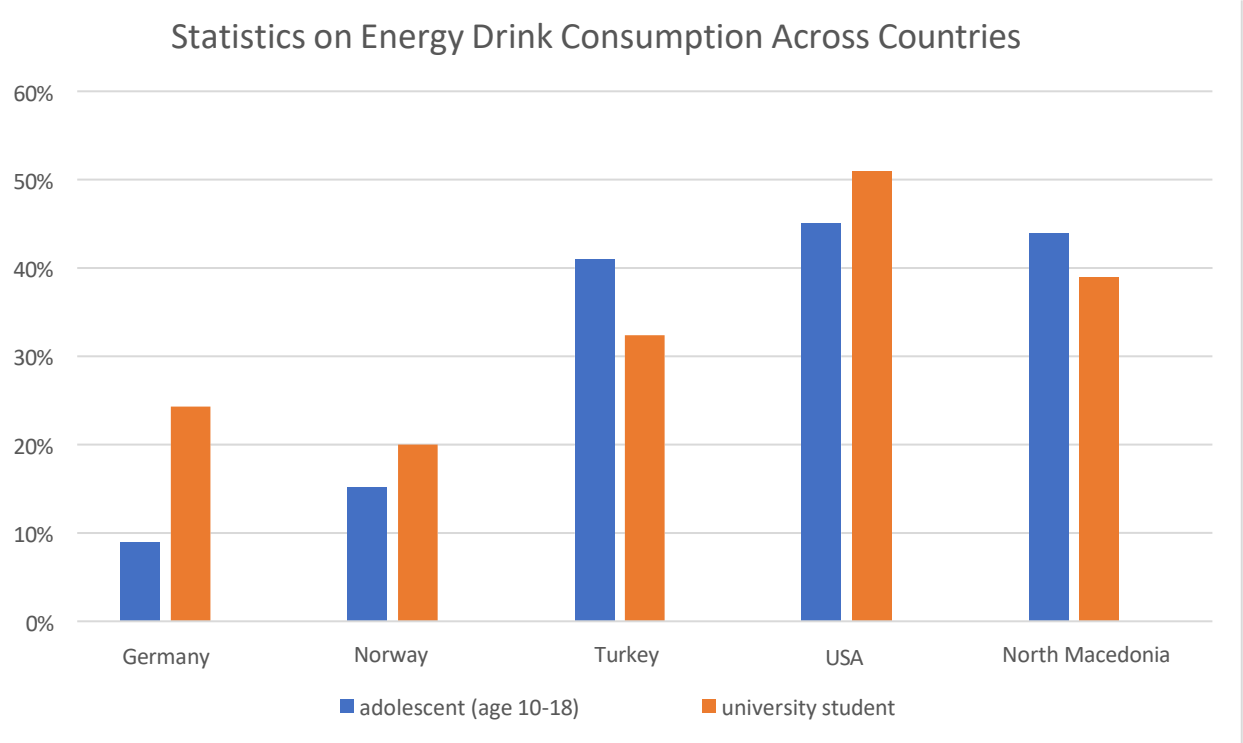
In recent years, energy drink consumption has become increasingly common, especially among young people. Promoted as quick solutions for fatigue and concentration, these beverages are often consumed without a full understanding of their ingredients or long-term health impacts. This paper explores the composition of energy drinks, their physiological effects, and the risks linked to frequent use. Cardiovascular complications, dependency symptoms, and metabolic disturbances have all been reported in scientific literature. The goal is to analyze consumption trends, identify the impact on health, and support public health initiatives aimed at safer use.
The study focuses on short- and long-term health implications, particularly in adolescents and university students, offering a balanced review of potential benefits and scientifically documented harms.
Furthermore, the study intends to present a balanced overview of both the potential benefits and the scientifically documented adverse effects, with the ultimate goal of informing public health strategies and contributing to safer consumption behaviors.

2. Material and methods

This research was conducted through a review of existing literature sourced from peer-reviewed journals, medical case reports, and public health databases. Specific attention was given to studies conducted in Europe and North America. Statistical data on consumption trends among adolescents and university students were synthesized to present a global and regional perspective. Graphical representations were used to highlight the disparity in consumption patterns and the relationship with reported health issues. Additionally, tables comparing positive and negative effects were created based on scientifically documented outcomes.

3. Results

Data collected from various sources indicate a growing trend in energy drink consumption, particularly among younger people. The figure below presents the percentages of energy drink consumption in these countries, highlighting adolescents and university students. This information offers a comparative look at how common energy drink consumption is and raises public health issues globally.



[5], [6], [7], [8], [9], [10]

Figure 1. Consumption of Energy Drinks Among Adolescents and University Students Across Countries

Table 1. Positive Effects of Energy Drinks

Category	Effect	Brief Description	References
Cognitive & Psychological	Increased concentration & memory	Enhances memory, concentration, and alertness after consumption	(40, 47, 50)
	Enhanced mood & energy	Higher energy sensation and improved mood	(47, 53)
	Improved driving performance	Fewer errors during simulated driving while fatigued	(49, 52)
Physical & Athletic	Increased aerobic endurance	Longer time to fatigue and higher intensity in cycling and running	(40, 43, 44, 46)
	Increased upper body strength	Improved muscular endurance in the upper body	(41)
	Faster physical response during workouts	Quicker physical reaction time during training	(42, 50)

Caffeine-Glucose Combo	"Restorative" effect on fatigue	Reduces mental fatigue and improves performance in control tests	(51, 53)

Table 2. Negative Effects of Energy Drinks

System Affected	Side Effect	Description	References
Cardiovascular	Increased heart rate & blood pressure	Stimulant effect from caffeine	(11)
	Ventricular arrhythmia, ST elevation, QT prolongation	Severe abnormal heart rhythms	(11)
	Atrial fibrillation	In healthy young males after high consumption	(12)
	Myocardial infarction	Linked to excessive consumption among adolescents	(13, 14)
	Endothelial dysfunction & platelet aggregation	Platelet activation via arachidonic acid	(15)
	Arterial dilation, aneurysm, dissection, rupture	Risks to the structure of major arteries	(16)
System Affected	**Side Effect**	**Description**	**References**
Neurological & Psychological	Caffeine intoxication (≥200 mg)	Anxiety, insomnia, tremors, gastrointestinal issues	(17)
	Acute & chronic headaches	Cerebral cortex hyperactivity	(18)
	Psychiatric disorders from caffeine	Intoxication, anxiety, insomnia, mood disturbances	(19)
	Violent behavior & behavioral disorders	Among adolescents with high caffeine intake	(20)
	Ischemic stroke & seizures	Reported after excessive energy drink intake	(21)
	Hallucinations (>300 mg/day)	Linked to elevated cortisol levels	(22, 23)
	Neuronal cell damage (apoptosis)	Decrease in brain-protective enzymes from caffeine-taurine-guarana combination	(24)
Gastrointestinal & Metabolic	Risk of obesity & type 2 diabetes	Due to high sugar content	(17, 25)
	Intestinal microbiota damage	Reduction in bacterial activity and diversity	(25)
	Increased blood sugar	Lowered insulin sensitivity from caffeine	(26, 27, 28)
	Liver damage	Cases with elevated liver enzymes and jaundice	(29, 30)
Renal (Kidneys)	Increased diuresis & dehydration	Especially during physical activity in hot environments	(31, 32)
	Sodium loss (natriuresis)	Muscle weakness due to electrolyte imbalance	(33, 34)
	Acute kidney injury	Fivefold increase in creatinine	(35)

		after daily intake over weeks	
Dental (Teeth)	Dental erosion	Caused by low pH and high sugar content	(36, 37, 38)
	Tooth neck sensitivity	Due to enamel layer erosion	(39)

4. Discussion

4.1. Energy Drinks: Active components and their impacts: Consumption of energy drinks has increased significantly in recent years due to their effects on improving concentration and physical performance, however, their excessive consumption has raised health concerns, especially negative effects on the cardiovascular system and concerns about excessive use among students. Energy drinks are a category of beverages that contain stimulants and other ingredients that are thought to increase energy and mental focus. Ingredients commonly found in energy drinks include:

- Sugar
- Caffeine
- Guarana
- Sodium
- B vitamins

Other possible ingredients include taurine, ginseng, creatine, ginkgo biloba, and carnitine.

A single 3.5 dl can of Red Bull contains 37 milligrams (mg) of sugar. This is equivalent to 9 teaspoons of table sugar and is more than the total daily recommended intake for adults in the US. How much sugar is too much sugar? Different sugars are used in different energy drinks, the most common of which is fructose (usually in the form of high-fructose corn syrup). Others contain sucrose (table sugar) made from sugar cane or sugar beets. A 250 ml can of Red Bull has about 80 mg of caffeine per serving, while a 500 ml can of Rockstar energy drink has about 160 mg. To give you some perspective, a 30 ml cup of espresso has anywhere from 47 mg to 75 mg of caffeine. Guarana is a popular natural ingredient found in many energy drinks. The fruit from the guarana plant (Paullinia cupanai) has long been considered an "energy tonic" as it contains two to five times the concentration of caffeine found in coffee beans.

A 250ml can of Monster Energy Drink provides 180mg of sodium per serving. This is a large percentage of your recommended daily sodium intake (less than 2,000mg per day), especially if you drink more than one. Compare that to a regular can of Coca-Cola which, while not a “healthy” alternative, only provides 18mg of sodium per serving. B vitamins are often considered the “energy vitamins” because they boost metabolism (the conversion of calories into energy). On the other hand, a B vitamin deficiency can lead to fatigue and severe energy loss. Although B vitamins make up only a small portion of the ingredients in energy drinks, they are often found in extremely high concentrations. This is especially true for vitamin B6 and vitamin B12, which were found to be at over 600% and 10,000% of the recommended daily intake in many energy drinks. [1]

There is limited evidence that consuming energy drinks can significantly improve physical and mental performance [2], the ability to drive while tired [3], and reduce mental fatigue during prolonged periods of concentration.[4] Unfortunately, the literature is limited and it is not known whether these improvements are due to caffeine, other herbal ingredients, or a combination of ingredients found in the drinks. [2]

Energy drinks typically contain caffeine, sugar, taurine, B-vitamins, and herbal extracts (e.g., guarana, ginseng). Caffeine and sugar are the primary active components. Caffeine (80–350 mg per serving) enhances alertness and performance by blocking adenosine receptors and increasing adrenaline, but also raises heart rate and blood pressure by 5–15 mmHg systolic and 5–10 mmHg diastolic even in healthy adults. [57]

Guarana and taurine can further amplify cardiovascular stress by increasing heart rate, enhancing the effects of caffeine, and overstimulating the nervous system. [58]
B-vitamins (niacin, B6, B12) support energy metabolism, but levels in most drinks are far above nutritional needs. Excess niacin can be hepatotoxic (e.g., ≥1 g/day), and any surplus is typically excreted. [59]

4.2. Public health consequences and reported adverse effects: From all the data and analyses processed in this paper, it is clear that the consumption of energy drinks is increasing significantly, especially among young people. All these data indicate a serious concern for public
health. Although some ingredients such as caffeine and vitamin B may have beneficial effects in moderate amounts, frequent use increases their concentration and is often associated with risks, as presented in Table 1 and Table 2, where it's seen clearly that the benefits are many times less than the possible harms. While there may be some short-term benefits, the long-term consequences, including potential cardiovascular problems, kidney damage, and mental health issues, are much more severe. The consumption of energy drinks has been linked to a range of serious health issues, including tachycardia, insomnia, kidney stones, and various other organ and systemic damages.
A 2023 survey conducted in North Macedonia among university students indicated that over 60% of respondents consumed at least one energy drink weekly during examination periods. This habitual intake correlated with symptoms such as palpitations, headaches, and gastrointestinal distress. These findings align with global studies in the U.S. and Germany, reinforcing concerns over widespread misuse.

4.3. Interpretation of consumption trends (Figure 1): As shown at Figure 1 a significant variation in energy drink consumption between adolescents and university students across the different countries. In the United States, the consumption rate is highest among both adolescents (45%) and university students (51%), suggesting a strong preference for energy drinks in this demographic. On the other hand, countries like Germany and Norway show much lower consumption rates.
In North Macedonia, the consumption among adolescents (44%) is relatively high, while university students have a lower percentage (38%).
These findings highlight the differences in energy drink consumption patterns across various regions and suggest the need for targeted public health measures to address the potential health risks associated with frequent consumption of these beverages, particularly among youngsters.
Peer pressure and social image strongly influence youth energy drink consumption. Students report feeling compelled to drink in social settings to seem 'cool' [54]. Moreover, pervasive social media and advertising used by 42% of adolescents to learn about energy drinks reinforce brand loyalty and perceived performance benefits [55]. In gaming communities, targeted marketing emphasizes focus and energy enhancement, cementing a performance-oriented lifestyle appeal [56].

5. Conclusion

In conclusion, the widespread consumption of energy drinks among adolescents and university students presents significant health concerns. Although these beverages provide temporary benefits such as increased alertness and concentration, the negative effects far outweigh these short-term advantages.
All the findings underscore the importance of raising awareness about the dangers of excessive energy drink consumption, particularly among young people who may be more susceptible to

its adverse effects. Public health initiatives should aim to educate the public on the long-term risks and promote healthier alternatives to sustain energy and focus. In addition to general awareness campaigns, public health policies should include mandatory warning labels on packaging, clear disclosure of caffeine and sugar content, regulation of marketing strategies especially those targeting youth and age restrictions on sales. Schools should implement educational programs to inform students about the risks of frequent consumption, and healthcare providers should screen for energy drink overuse during routine visits.
Health professionals should actively participate in raising awareness, and future research should focus on longitudinal studies assessing the cumulative effects of energy drink consumption on different organ systems.

References

[1] Veeraish Chauhan, M. (2025, January 18). *Do energy drinks cause kidney stones?*. Verywell Health. from: https://www.verywellhealth.com/energy-drinks-effect-on-kidneys-and-health-2085792

[2] Scholey, A. B., and D. O. Kennedy. 2004. Cognitive and physiological effects of an "energy drink": An evaluation of the whole drink and of glucose, caffeine and herbal flavouring fractions. Psychopharmacology 176:320-330.

[3] Reyner, L. A., and J. A. Horne. 2002. Efficacy of a 'functional energy drink' in counteracting driver sleepiness. Physiol Behav 75:331-335.

[4] Nutrition and health info sheet: Energy drinks. (n.d.). from: https://anrcatalog.ucanr.edu/pdf/8265.pdf

[5] EFSA, 2011. "Energy Drink Consumption in the EU."

[6] Frontiers in Public Health, 2014. from: https://www.frontiersin.org/articles/10.3389/fpubh.2014.00134/full

[7] PMC, Germany Study. from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8734177/

[8] PMC, Norway and Slovakia Studies. from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8565280/

[9] University of Skopje Student Survey, 2023 (unpublished data) Local Public Health Surveys in RMV, 2022 (internal reports)

[10] CDC, USA Youth Risk Behavior Surveillance (YRBS), 2019. from: https://www.cdc.gov/healthyyouth/data/yrbs/index.htm

[11] Goldfarb M, Tellier C, Thanassoulis G. Review of published cases of adverse cardiovascular events after ingestion of energy drinks. The American journal of cardiology. 2014;113(1):168–172. doi: 10.1016/j.amjcard.2013.08.058. [DOI] [PubMed] [Google Scholar]

[12] Di Rocco JR, During A, Morelli PJ, Heyden M, Biancaniello TA. Atrial fibrillation in healthy adolescents after highly caffeinated beverage consumption: two case reports. J Med Case Reports. 2011;5(1):18. doi: 10.1186/1752-1947-5-18. [DOI] [PMC free article] [PubMed] [Google Scholar]

[13] Scott MJ, El-Hassan M, Khan AA. Myocardial infarction in a young adult following the consumption of a caffeinated energy drink. BMJ case reports. 2011;2011: bcr0220113854. doi: 10.1136/bcr.02.2011.3854. [DOI] [PMC free article] [PubMed] [Google Scholar]

[14] Wilson RE, Kado HS, Samson R, Miller AB. A case of caffeine-induced coronary artery vasospasm of a 17-year-old male. Cardiovascular toxicology. 2012;12(2):175–179. doi: 10.1007/s12012-011-9152-9. [DOI] [PubMed] [Google Scholar]

[15] Pommerening MJ, Cardenas JC, Radwan ZA, Wade CE, Holcomb JB, Cotton BA. Hypercoagulability after energy drink consumption. Journal of Surgical Research. 2015 doi: 10.1016/j.jss.2015.06.027. [DOI] [PubMed] [Google Scholar]

[16] González W, Altieri P, Alvarado E, Banchs H, Colón E, Escobales N, et al. Celiac trunk and branches dissection due to energy drink consumption and heavy resistance exercise: case report and review of literature. Boletin de la Asociacion Medica de Puerto Rico. 2014;107(1):38–40. [PubMed] [Google Scholar]

[17] Bedi N, Dewan P, Gupta P. Energy drinks: Potions of illusion. Indian pediatrics. 2014;51(7):529–533. doi: 10.1007/s13312-014-0441-9. [DOI] [PubMed] [Google Scholar]

[18] Espinosa JC, Sobrino MF. Caffeine and headache: specific remarks. Neurologia (Barcelona, Spain) 2015 doi: 10.1016/j.nrl.2014.12.016. [DOI] [PubMed] [Google Scholar]

[19] Juliano LM, Evatt DP, Richards BD, Griffiths RR. Characterization of individuals seeking treatment for caffeine dependence. Psychology of Addictive Behaviors. 2012;26(4):948. doi: 10.1037/a0027246. [DOI] [PMC free article] [PubMed] [Google Scholar]

[20] Kristjansson AL, Sigfusdottir ID, Frost SS, James JE. Adolescent caffeine consumption and self-reported violence and conduct disorder. Journal of youth and adolescence. 2013;42(7):1053– 1062. doi: 10.1007/s10964-013-9917-5. [DOI] [PubMed] [Google Scholar]
[21] Dikici S, Saritas A, Besir FH, Tasci AH, Kandis H. Do energy drinks cause epileptic seizure and ischemic stroke? The American journal of emergency medicine. 2013;31(1):274.e271– 274.e274. doi: 10.1016/j.ajem.2012.05.018. [DOI] [PubMed] [Google Scholar]
[22] Jones SR, Fernyhough C. Caffeine, stress, and proneness to psychosis-like experiences: A preliminary investigation. Personality and Individual Differences. 2009;46(4):562–564. [Google Scholar]
[23] Crowe S, Barot J, Caldow S, d'Aspromonte J, Dell'Orso J, Di Clemente A, et al. The effect of caffeine and stress on auditory hallucinations in a non-clinical sample. Personality and Individual Differences. 2011;50(5):626–630. [Google Scholar]
[24] Zeidán-Chuliá F, Gelain DP, Kolling EA, Rybarczyk-Filho JL, Ambrosi P, Resende Terra S, et al. Major components of energy drinks (caffeine, taurine, and guarana) exert cytotoxic effects on human neuronal SH-SY5Y cells by decreasing reactive oxygen species production. Oxidative medicine and cellular longevity. 2013;2013 doi: 10.1155/2013/791795. [DOI] [PMC free article] [PubMed] [Google Scholar]
[25] Greenblum S, Turnbaugh PJ, Borenstein E. Metagenomic systems biology of the human gut microbiome reveals topological shifts associated with obesity and inflammatory bowel disease. Proceedings of the National Academy of Sciences. 2012;109(2):594–599. doi: 10.1073/pnas.1116053109. [DOI] [PMC free article] [PubMed] [Google Scholar]
[26] Lee S, Hudson R, Kilpatrick K, Graham TE, Ross R. Caffeine ingestion is associated with reductions in glucose uptake independent of obesity and type 2 diabetes before and after exercise training. Diabetes Care. 2005 Mar;28(3):566–572. doi: 10.2337/diacare.28.3.566. [DOI] [PubMed] [Google Scholar]
[27] Ragsdale FR, Gronli TD, Batool N, Haight N, Mehaffey A, McMahon EC, et al. Effect of Red Bull energy drink on cardiovascular and renal function. Amino Acids. 2010;38(4):1193– 1200. doi: 10.1007/s00726-009-0330-z. [DOI] [PubMed] [Google Scholar]
[28] Beaudoin M-S, Allen B, Mazzetti G, Sullivan PJ, Graham TE. Caffeine ingestion impairs insulin sensitivity in a dose-dependent manner in both men and women. Applied Physiology, Nutrition, and Metabolism. 2012;38(2):140–147. doi: 10.1139/apnm-2012-0201. [DOI] [PubMed] [Google Scholar]
[29] Vivekanandarajah A, Ni S, Waked A. Acute hepatitis in a woman following excessive ingestion of an energy drink: a case report. J Med Case Rep. 2011;5(227):8. doi: 10.1186/1752- 1947-5-227. [DOI] [PMC free article] [PubMed] [Google Scholar]
[30] Huang B, Kunkel D, El Kabany M. Acute Liver Failure Following One Year of Daily Consumption of a Sugar-Free Energy Drink. ACG case reports journal. 2014;1(4):214. doi: 10.14309/crj.2014.57. [DOI] [PMC free article] [PubMed] [Google Scholar]
[31] Riesenhuber A, Boehm M, Posch M, Aufricht C. Diuretic potential of energy drinks. Amino Acids. 2006 Jul;31(1):81–83. doi: 10.1007/s00726-006-0363-5. [DOI] [PubMed] [Google Scholar]
[32] Montain SJ, Coyle EF. Influence of graded dehydration on hyperthermia and cardiovascular drift during exercise. Journal of Applied Physiology. 1992;73(4):1340–1350. doi: 10.1152/jappl.1992.73.4.1340. [DOI] [PubMed] [Google Scholar]
[33] Mora-Rodriguez R, Pallarés JG. Performance outcomes and unwanted side effects associated with energy drinks. Nutrition reviews. 2014;72(suppl 1):108–120. doi: 10.1111/nure.12132. [DOI] [PubMed] [Google Scholar]
[34] Coso JD, Estevez E, Baquero RA, Mora-Rodriguez R. Anaerobic performance when rehydrating with water or commercially available sports drinks during prolonged exercise in the heat. Applied Physiology, Nutrition, and Metabolism. 2008;33(2):290–298. doi: 10.1139/H07-
[35] 188. [DOI] [PubMed] [Google Scholar]
[36] Greene E, Oman K, Lefler M. Energy Drink–Induced Acute Kidney Injury. Annals of Pharmacotherapy. 2014;48(10):1366–1370. doi: 10.1177/1060028014541997. [DOI] [PubMed] [Google Scholar]
[37] Hasselkvist A, Johansson A, Johansson A-K. Dental erosion and soft drink consumption in Swedish children and adolescents and the development of a simplified erosion partial recording system. Swedish dental journal. 2009;34(4):187–195. [PubMed] [Google Scholar]
[38] Marshall TA, Levy SM, Broffitt B, Warren JJ, Eichenberger-Gilmore JM, Burns TL, et al. Dental caries and beverage consumption in young children. Pediatrics. 2003;112(3):e184–e191. doi: 10.1542/peds.112.3.e184. [DOI] [PubMed] [Google Scholar]

[39] Li H, Zou Y, Ding G. Dietary factors associated with dental erosion: a meta-analysis. PLoS One. 2012;7(8):e42626. doi: 10.1371/journal.pone.0042626. [DOI] [PMC free article] [PubMed] [Google Scholar]
[40] Pinto SC, Bandeca MC, Silva CN, Cavassim R, Borges AH, Sampaio JE. Erosive potential of energy drinks on the dentine surface. BMC research notes. 2013;6(1):67. doi: 10.1186/1756- 0500-6-67. [DOI] [PMC free article] [PubMed] [Google Scholar]
[41] Alford C, Cox H, Wescott R. The effects of red bull energy drink on human performance and mood. Amino Acids. 2001;21(2):139–150. doi: 10.1007/s007260170021. [DOI] [PubMed] [Google Scholar]
[42] Forbes SC, Candow DG, Little JP, Magnus C, Chilibeck PD. Effect of Red Bull energy drink on repeated Wingate cycle performance and bench-press muscle endurance. Int J Sport Nutr Exerc Metab. 2007 Oct;17(5):433–444. doi: 10.1123/ijsnem.17.5.433. [DOI] [PubMed] [Google Scholar]
[43] Hoffman JR, Kang J, Ratamess NA, Hoffman MW, Tranchina CP, Faigenbaum AD. Examination of a pre-exercise, high energy supplement on exercise performance. J Int Soc Sports Nutr. 2009;6:2. doi: 10.1186/1550-2783-6-2. [DOI] [PMC free article] [PubMed] [Google Scholar]
[44] Ivy JL, Kammer L, Ding Z, Wang B, Bernard JR, Liao YH, et al. Improved cycling time- trial performance after ingestion of a caffeine energy drink. Int J Sport Nutr Exerc Metab. 2009 Feb;19(1):61–78. doi: 10.1123/ijsnem.19.1.61. [DOI] [PubMed] [Google Scholar]
[45] Walsh AL, Gonzalez AM, Ratamess NA, Kang J, Hoffman JR. Research article Improved time to exhaustion following ingestion of the energy drink. Amino Impact™. 2010 doi: 10.1186/1550-2783-7-14. [DOI] [PMC free article] [PubMed] [Google Scholar]
[46] Walker TB, Balldin U, Fischer J, Storm W, Warren GL. Acceleration tolerance after ingestion of a commercial energy drink. Aviation, space, and environmental medicine. 2010;81(12):1100–1106. doi: 10.3357/asem.2833.2010. [DOI] [PubMed] [Google Scholar]
[47] Perez-Lopez A, Salinero JJ, Abian-Vicen J, Valades D, Lara B, Hernandez C, et al. Caffeinated Energy Drinks Improve Volleyball Performance in Elite Female Players. Med Sci Sports Exerc. 2014 Jul 18; doi: 10.1249/MSS.0000000000000455. [DOI] [PubMed] [Google Scholar]
[48] Wesnes KA, Barrett ML, Udani JK. An evaluation of the cognitive and mood effects of an energy shot over a 6h period in volunteers. A randomized, double-blind, placebo controlled, cross-over study. Appetite. 2013;67:105–113. doi: 10.1016/j.appet.2013.04.005. [DOI] [PubMed] [Google Scholar]
[49] Warburton DM, Bersellini E, Sweeney E. An evaluation of a caffeinated taurine drink on mood, memory and information processing in healthy volunteers without caffeine abstinence. Psychopharmacology. 2001;158(3):322–328. doi: 10.1007/s002130100884. [DOI] [PubMed] [Google Scholar]
[50] Reyner L, Horne J. Efficacy of a 'functional energy drink' in counteracting driver sleepiness. Physiology & behavior. 2002;75(3):331–335. doi: 10.1016/s0031-9384(01)00669-2. [DOI] [PubMed] [Google Scholar]
[51] Smit HJ, Rogers PJ. Effects of 'energy' drinks on mood and mental performance: critical methodology. Food quality and preference. 2002;13(5):317–326. [Google Scholar]
[52] Smit HJ, Grady ML, Finnegan YE, Hughes S-AC, Cotton JR, Rogers PJ. Role of familiarity on effects of caffeine-and glucose-containing soft drinks. Physiology & behavior. 2006;87(2):287–297. doi: 10.1016/j.physbeh.2005.10.017. [DOI] [PubMed] [Google Scholar]
[53] Horne J, Reyner L. Beneficial effects of an "energy drink" given to sleepy drivers. Amino Acids. 2001;20(1):83–89. doi: 10.1007/s007260170068. [DOI] [PubMed] [Google Scholar]
[54] Howard MA, Marczinski CA. Acute effects of a glucose energy drink on behavioral control. Exp Clin Psychopharmacol. 2010;18(6):553. doi: 10.1037/a0021740. [DOI] [PubMed] [Google Scholar]
[55] Ghozayel M, Ghaddar A, Farhat G, Nasreddine L, Kara J, Jomaa L. Energy drinks consumption and perceptions among University Students in Beirut, Lebanon: A mixed methods approach. PLoS One. 2020 Apr 30;15(4):e0232199. doi: 10.1371/journal.pone.0232199. PMID: 32353017; PMCID: PMC7192412. from: pmc.ncbi.nlm.nih.gov From: reddit.com
[56] Roscoe, D., Pu, H., Cuy Castellanos, D., & Dalton, J. (2023). "Fueling the Games": Energy Drink Consumption, Marketing, and the Associated Perceptions and Behaviors in Video Gaming. Journal of Electronic Gaming and Esports, 1(1), jege.2022-0047. Retrieved Jun 18, 2025, from: https://doi.org/10.1123/jege.2022-0047
[57] from: https://www.verywellhealth.com/do-energy-drinks-raise-blood-pressure-11747058?utm_
[58] Wassef B, Kohansieh M, Makaryus AN. Effects of energy drinks on the cardiovascular system. World J Cardiol. 2017;9(11):796-806. doi:10.4330/wjc.v9.i11.796
[59] https://www.verywellmind.com/energy-drinks-and-mental-health-11718418?utm_