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The dangers of energy drinks to the health of young people

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***Abstract*---**This study has conducted a systematic review of the dangers of energy drinks (EDs) to the health of young people. 10 peer-reviewed articles published within the last five years were identified after careful screening of the search results in different databases. One major theme was apparent from the systematic review: energy drink consumption has adverse impacts on the health of young adults. The dangers of EDs manifest in form of reduced sleep, missed breakfasts, increased blood pressure and heart rate, cardiovascular issues, mental health problems, and oral health. A large proportion of young adults are unaware of the danger of energy drinks, and only associate them with improved performance. Public health initiatives should aim to educate the youth about the adverse impacts of EDs. Companies should also practice transparency in labeling with appropriate instructions for the right age of use.

***Keywords*---**energy drinks, systolic, diastolic pressure, sleep, mental health.

Introduction

Energy drinks were first introduced in 1987 and have since become a popular industry. The major constituents of energy drinks include caffeine, vitamins, taurine, amino acids, and glucuronolactone. EDs are marketed to have the ability to improve the physical stamina and mental alertness of individuals, making young adults, office workers, and sports personnel the largest consumers of EDs (Higgins et al., 2018). Caffeine is the most common ingredient in EDs with the potential to be rapidly and completely absorbed after digestion. The liver metabolizes caffeine into various substitutes. The levels of caffeine vary in different energy drink brands. Energy drinks, such as Red Bull and Monster Energy, in conjunction with fast foods, are some of the most consumed items among young adults, and the major contributors to the increasing obesity and other health-related issues. Unfortunately, adolescents are not aware of the

adverse risks of energy drinks. Most young adults associate energy drinks with enhanced performance, mood, and alertness. Energy drinks are used as a source of pleasure and excitement, and to cope with stressful situations. Thus, they have a high market demand. There has been contradictory information about the impacts of EDs in improving performance, making it challenging to draw conclusions about their negative effects. This systematic review aims to summarize evidence about the danger of energy drinks on the health of young people.

Research Question

What are the dangers of energy drinks to young people's health?

Methods

This research employed a systematic review of clinical articles which contained information answering the research question. A search was conducted on EBSCOhost, Google Scholar, and Gale using the keywords, “energy drinks” and “the health of young people.” This study categorized young adults as teenagers and the youth aged 10-25 years. The results were filtered to include peer-reviewed articles that were published in the last 5 years. Inclusion criteria included studies that could be accessed in full text and those that provided extensive information about the research question. The exclusion criteria included abstract only papers, duplicated information, unavailable full texts, and those that do not focus on the health impacts of energy drinks on the target population.

Results

Adolescents prone to consuming large amounts of energy drinks are most likely to demonstrate emotional problems, such as anxiety, stress, depression, and nervousness. According to Veselska et al. (2021), a mediated relationship exists between the consumption of energy drinks and emotional and behavioral problems. Similarly, negative behavioral outcomes are evident in the forms of self-destructive, aggressive, and violent behaviors. Emotional and behavioral problems are mediated by sleep duration, whereby the excessive use of EDs causes reduced sleep duration. Adolescents using EDs are also likely to skip breakfast, enhancing their emotional and behavioral issues. Conversely, Svensson et al. (2021) conducted a longitudinal study into the relationship between EDs consumption and norm-breaking behaviors among adolescents. The study that was conducted among Swedish young adults identified associations between EDs consumption and worsened health. Most adolescents using EDs rarely take breakfast every school day and engage in truancy behaviors.

Sleep is an important aspect of the health and well-being of individuals. Reduced or insufficient sleep can cause adverse health issues including poor mental and somatic health. Caffeine is a major component in EDs, and it is commonly referred to as a psychotic drug. 10th-grade students were involved in the study and identified that they used EDs before bed (Hammond et al., 2018). Most of the participants reported that they rarely get 8 hours of sleep. Consuming EDs is associated with longer shuteye latency. Consequently, the failure to get sufficient

sleep manifests in various health problems. Similarly, a study conducted among Norwegian adolescents indicated that EDs consumption is associated with various mental health issues. Adolescents using EDs failed to get the recommended amount of sleep (Kaldenbach et al., 2022). This led to physical health deficiencies due to poor emotional and optimal neurocognitive functioning.

Nowak et al. (2019) conducted a study where two groups of young adult participants were introduced to different types of drinks to identify the effects on their health. One group was given organic nono fruit and chokeberry juices, while the other group was given an energy drink. A comparison of the two groups revealed that the noni group had the lowest diastolic and systolic blood pressure. Additionally, this group reported a decrease in the heart rate by a few beats. Conversely, the group that was given energy drinks indicated an increase in their heart rate and diastolic and systolic blood pressure. The results of this study demonstrate that the consumption of energy drinks is associated with acute effects on blood pressure and heart rate. Young adults face the risk of an increase in blood glucose and insulin levels due to the consumption of EDs. Connectively, high blood pressure values in young adults are rampant. Martyn and Chmiel (2019) claim that long-term consumption of energy drinks leads to the tension of the blood vessels. The continuous high pressure in the blood walls might lead to disorders such as hypertension and arrhythmia. A study conducted on 309 students revealed high numbers of diastolic and systolic hypertension in EDs users. Men are mostly affected as they have more EDs.

The consumption of EDs is associated with anxiety, stress, and depression in young adults. According to Kaur et al. (2020), negative psychological problems are due to the caffeine in EDs, which has stimulating properties. The authors conducted a longitudinal study that involved 20-22 years of follow-up of participants from the time of pregnancy. Participants who reported never having used EDs had better mental health in comparison to frequent users. Thus, EDs might either initiate or exacerbate the symptoms of depression, stress, and anxiety.

16 European countries record a lifetime prevalence use of EDs among adolescents aged 10-18 years. The same results were found in other countries including Germany, Canada, and Norwegian. Erdmann et al. (2021) assert that most companies do not disclose the ingredients found in their EDs. Approximately 74-240mg of caffeine can be found in an energy drink in comparison to the 77-150mg of caffeine found in a cup of coffee. Caffeine is associated with the peripheral organs and the central nervous system whereby it acts as a stimulant that inhibits the sleep-promoting adenosine. This results in the reals of serotonin, dopamine, and norepinephrine in the brain, causing improved mood psychomotor coordination, alertness, and fatigue delay (Erdmann et al., 2021). Caffeine also has the potential to improve the performance of the skeletal muscles. Taurine is another ingredient found in EDs with the potential to modulate contractile function. These two ingredients have led to the assumption that EDs improve sports performance. However, the authors allege that there are alarming effects of EDs consumption. EDs affect the neurological and cardiovascular systems, with symptoms, such as insomnia, shaking hands, increased urination for the renal

system, and gastrointestinal upset. Sudden deaths have also been reported among patients with high-risk cardiovascular issues.

Pratha and Prabakar (2019) conducted a Vivo randomized trial to investigate the impact of EDs consumption on the oral health of young adults. Saliva plays a major role in the maintenance of oral health, and its consistency depends on its constituents. Health professionals utilize saliva to measure the health and disease status of a patient. Therefore, normal saliva should have a pH ranging from 6.2-7.6. Saliva maintains the pH in the oral cavity by eliminating carbohydrates which could be metabolized by bacteria leading to aid production and by buffering mechanisms. Patients with dental problems were found to have a more acidic pH of the saliva.

Two groups that were involved in the study showed a major difference in the pH of their saliva. Group 1 was exposed to mineral water, group 2 was introduced to Pepsi's carbonated drink, whereas group 3 was given Monster energy, one of the popular energy drinks. The results of the study indicated an increase in the pH after consuming mineral water from group 1 while group 2 indicated a decrease in the pH 1-15 minutes after taking Pepsi and gradually increased after 30 minutes. However, the pH was the lowest for group 3, demonstrating how harmful it is to the oral environment. According to the authors, a strong relationship exists between EDs use and dental erosion. This is due to the high amounts of sugar and low pH content in the drinks, which can cause hypersensitivity.

According to Ruiz and Scherr (2019), there is no evidence to back up the claims of energy drink companies about the benefits of their products to users. The authors argue that EDs have negative outcomes on the health of users including headaches, insomnia, upset stomach, and mood swings. Moreover, EDs cause cardiovascular issues including renal and liver diseases. There have been reports of death, though rare.

Discussion

The ten articles highlight the dangers of energy drinks to the health of young adults. Young adults face a wide variety of health risks from consuming energy drinks. Most young adults claim to consume EDs to cope with stressful situations and to improve their mood and emotions, without an awareness of the significant risks they face. Thus, educating young adults about the dangers of energy drinks is paramount to increasing their awareness about engaging in healthy habits to improve their wellbeing. Messages need to be reinforced that EDs are not appropriate for children and young adults. Instituting strict regulatory actions is also vital to limit the amount of caffeine put in EDs. Moreover, it should be mandatory for companies to practice labeling transparency with appropriate warnings and instructions about the right age for using EDs.

Conclusion

Overall, young adults face significant risks to their mental, dental, emotional, physical, and behavioral health due to using EDs. Oral health is affected, as EDs reduce the pH level of the saliva. High acidity in oral cavities is associated with

various dental issues. Emotional and behavioral problems mediated by reduced sleep and missed breakfast are one of the major impacts of ED consumption. Moreover, EDs affect the blood pressure and heart rate by causing them to rise. Sweetened energy drinks will increase blood glucose and insulin levels. Therefore, public health initiatives should aim to increase education and awareness about the dangers of energy drinks.

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