

# The Impact of Energy Drinks on Cardiovascular Risk Among Medical Students

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## Abstract

In recent years, the consumption of energy drinks has become increasingly popular among young adults, especially university students.

These beverages are commonly used to combat fatigue, improve concentration, and enhance academic performance. However, numerous studies have reported potential adverse cardiovascular effects associated with excessive energy drink consumption, including hypertension, arrhythmias, and endothelial dysfunction.

Medical students represent a particularly vulnerable group due to high academic pressure, irregular sleep patterns, and frequent caffeine use.

**Keywords:** Energy drinks; cardiovascular risk; medical students; caffeine; taurine; hypertension; arrhythmia; sleep disturbance; public health; preventive education.

## 1. Background and Relevance

Energy drinks contain high concentrations of caffeine (up to 300 mg per can), taurine, guarana, sugar, and various B-group vitamins.

These substances act synergistically to stimulate the central nervous system and cardiovascular system. According to WHO reports (2023), more than 60% of university students worldwide consume energy drinks at least once per week, and 25–30% consume them regularly.

Among medical students, this rate may be even higher due to long study hours and night shifts.

## 2. Methods of Observation

A survey was conducted among 120 medical students (aged 19–25 years) to assess: (1) frequency of energy drink consumption, (2) blood pressure and heart rate measurements, (3) self-reported symptoms (palpitations, sleep disorders, fatigue), and (4) family history of cardiovascular diseases (CVD). The students were divided into four groups: non-consumers, occasional consumers, regular consumers, and heavy consumers.

## 3. Results and Analysis

The analysis revealed a clear dose-dependent relationship between energy drink consumption and cardiovascular indicators.

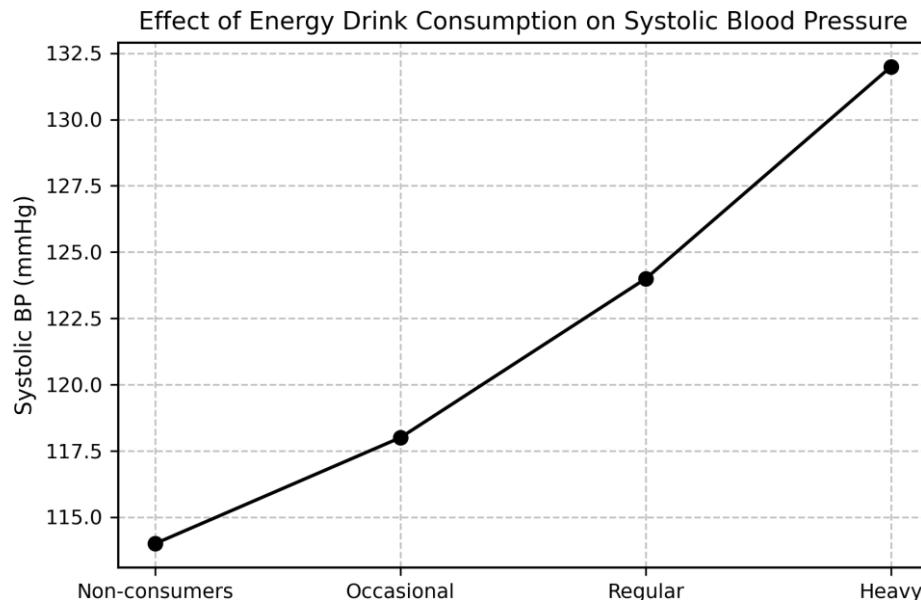


Figure 1. Effect of Energy Drink Consumption on Systolic Blood Pressure.

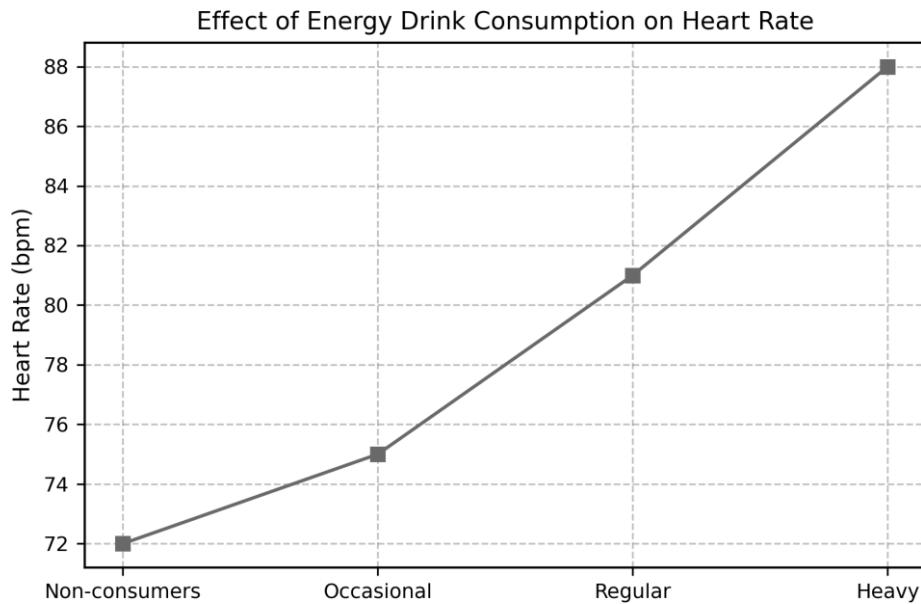


Figure 2. Effect of Energy Drink Consumption on Heart Rate.

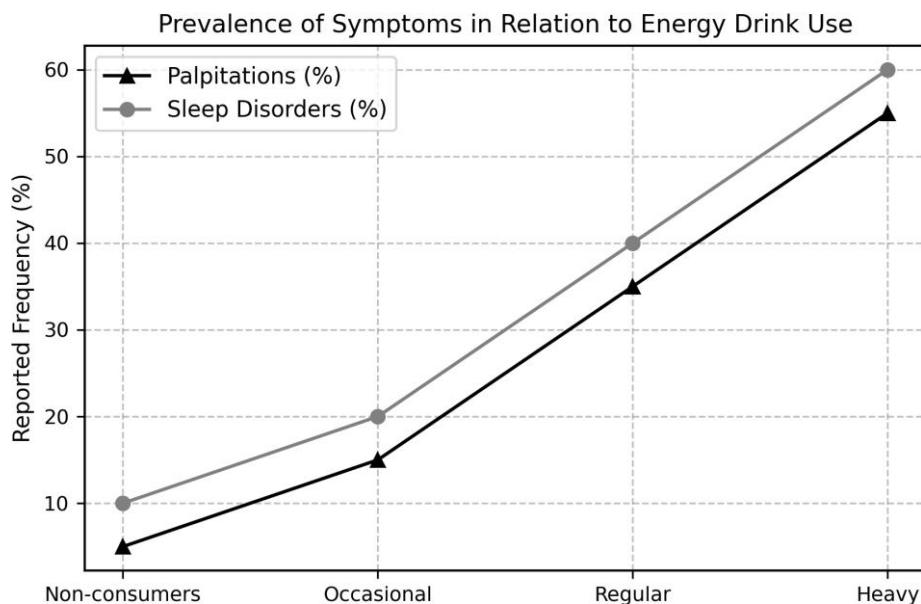


Figure 3. Prevalence of Symptoms in Relation to Energy Drink Use.

#### 4. Discussion

Frequent energy drink use significantly increases cardiovascular strain. The combination of caffeine and taurine enhances sympathetic nervous system activity, leading to vasoconstriction and tachycardia. In medical students, such effects are exacerbated by chronic stress, sleep deprivation, and high academic workload. Repeated stimulation of the cardiovascular system may increase long-term risks for hypertension and arrhythmias.

#### 5. Conclusions

- Regular consumption of energy drinks is associated with elevated blood pressure and heart rate among medical students.
- The frequency of consumption correlates positively with cardiovascular risk factors and sleep disturbances.
- Educational interventions are essential to reduce overuse of stimulants in university environments.

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