Medical Science

To Cite:
Szyszkowski J, Zawadzka I, Kriese N, Kowalski B, Zgrzywa Z, Komorowska E, Tucka B, Wądołowska P, Jaworski J, Kucharski T. Impact of energy drink consumption on sleep quality among university students: A systematic review. *Medical Science* 2026; 30: e86ms3871
doi: https://doi.org/10.54905/disssi.v30i171.e86ms3871

Authors' Affiliation:
Medical University of Warsaw, Warsaw, Poland

***Corresponding author:**
Jakub Szyszkowski, Medical University of Warsaw, ul. Zwirki i Wigury 61, 02-091, Warsaw, Poland
Email: jakubszysz@icloud.com

ORCID list:
Jakub Szyszkowski - 0009-0000-3217-6981
Brygida Tucka – 0009-0004-1785-2186
Natalia Kriese – 0009-0001-8278-1044
Izabella Zawadzka – 0009-0008-3149-2550
Bartłomiej Kowalski - 0009-0003-5856-2663
Ewelina Komorowska - 0009-0001-4103-7745
Zuzanna Zgrzywa – 0009-0005-1032-8063
Paulina Wądołowska – 0009-0005-5646-1775
Tomasz Kucharski - 0009-0007-5647-9021
Jakub Jaworski - 0009-0004-7140-9679

Peer-Review History
Received: 16 September 2025
Reviewed & Revised: 07/October/2025 to 25/April/2026
Accepted: 06 May 2026
Published: 15 May 2026

Peer-review Method
External peer-review was done through double-blind method.

Medical Science
pISSN 2321–7359; eISSN 2321–7367

Impact of energy drink consumption on sleep quality among university students: A systematic review

Jakub Szyszkowski*, Izabella Zawadzka, Natalia Kriese, Bartłomiej Kowalski, Zuzanna Zgrzywa, Ewelina Komorowska, Brygida Tucka, Paulina Wądołowska, Jakub Jaworski, Tomasz Kucharski

ABSTRACT

University life puts enormous pressure on students, which means they have to constantly compromise on their studies over healthy sleep. To push through the resulting exhaustion and keep their focus sharp, many turn to energy drink. The heavy doses of caffeine in these beverages—alongside active stimulants like taurine and guarana—end up seriously disrupting the body is natural sleep mechanics. *Aim:* This review analyze the current medical knowledge and literature on the impact of regular energy drink consumption on sleep quality among university students. *Materials and Methods:* To construct this review, we searched three major databases: PubMed/MEDLINE, Scopus, and Google Scholar. Our analysis was limited to articles originally published in English. *Results:* Heavy energy drink use actively destroys sleep. Compared to non-consumers, regular users spend far more time tossing and turning before finally dropping off (increased sleep latency). Once asleep, they get fewer total hours and wake up feeling much less rested. Physiologically, the massive caffeine load essentially hijacks the brain is adenosine receptors, shutting down the natural chemical signals needed to initiate rest. *Conclusions:* It is clear that relying on energy drinks is a primary—and avoidable—driver of insomnia on campus. Given the direct link between sleep and grades, colleges cannot afford to ignore this. Instead of just giving general advice, we should be teaching students about the physiological costs of caffeine addiction and showing them how to manage their energy without burning out.

Keywords: Energy drinks, Sleep Quality, University Students, Caffeine, Sleep Latency

1. INTRODUCTION

1.1. The Rise of Energy Drinks

The global beverage market looks vastly different from how it did a few decades ago. Back in the nineties, energy drinks (EDs) only really appealed to extreme sports enthusiasts. They were an entirely niche product. Not anymore. Explosive growth has turned them into a daily staple for millions worldwide. University students, in particular, sit squarely in the crosshairs of ED marketing campaigns.

The reason why is pretty obvious. Academic environments run on high stress, crushing workloads, and notoriously bad sleep schedules. Ultimately, the simple promise of sudden energy and forced concentration is incredibly hard for exhausted students to ignore (Lemma et al., 2012; Reissig et al., 2009).

1.2. Composition and Pharmacology

The actual difference between coffee and energy drinks is based on the complex chemical composition of the latter. Caffeine is obviously the main player, and the amounts can vary a lot—anywhere from 80mg to over 300mg in a single serving. But that "kick" is not just from the caffeine alone. These beverages are essentially a mix of different metabolic and psychoactive ingredients. Most brands throw in what they call an "energy blend," which is usually a combination of taurine, guarana, ginseng, B-vitamins, and L-carnitine (Reissig et al., 2009).

- Caffeine: It acts as a stimulant for the central nervous system by basically "plugging" the brain is adenosine receptors (specifically A1 and A2A). By blocking these, caffeine stops the brain from actually registering that the body is tired.
- Taurine: This is an amino acid that helps manage calcium levels inside our cells. Research suggests it might work alongside caffeine to boost the physical impact on the heart and nerves in ways that are not always predictable.
- Guarana: Often marketed as a natural plant extract, guarana is actually a highly concentrated source of naturally occurring caffeine (guaranine). In fact, guarana seeds hold roughly double the caffeine of regular coffee beans. Because manufacturers do not always factor this plant extract into the primary caffeine count on the label, students easily end up consuming far more stimulants than they realize.

1.3. The Physiology of Sleep and Academic Life

Sleep is a key element of the body is biological balance. It might seem like a simple period of rest, but in reality, the brain continues to work during this time. While we sleep, the brain processes information collected during the day, strengthens new memories, and helps regulate emotions. Sleep also allows cognitive functions to recover after long periods of mental activity. Because of this, the amount and quality of sleep can strongly influence a student is ability to learn.

Staying consistent with sleep is easier said than done in the middle of university life. Between erratic class schedules and the sudden pile-up of deadlines, most students find that a routine is the first thing to go. It is common to see people grinding through the late hours just to keep up with assignments or cram for exams—sometimes skipping sleep entirely. It might feel like a necessary trade-off at the time, but it really just wrecks your internal clock. Over time, these habits cut deep into the recovery time the body needs to function.

You know how you get progressively more tired as the day drags on? That is simply adenosine slowly pooling up in the basal forebrain. It acts as our basic homeostatic sleep drive. Caffeine, however, functions as a chemical barricade. Because of this, you end up tossing and turning. Plus, your actual sleep quality takes a hit since those vital slow-wave phases get completely thrown off (Higbee et al., 2022; Lemma et al., 2012). Pounding energy drinks after dark sets off this exact disaster—a wildly bad idea that remains a staple for students pulling all-nighters.

1.4. Aim of the Review

The goal of this paper is actually quite simple. Energy drinks are everywhere on college campuses. However, there is a gap in students' knowledge about the damage these drinks cause to their sleep. It is one thing to feel that quick hit of alertness, but it is another thing entirely to deal with the way it quietly wrecks sleep efficiency and mental health over time. This review focuses on exposing those less obvious—but much more dangerous—effects that most people just overlook.

Therefore, the aim of this review is to analyze and summarize the existing evidence regarding the effects of ED consumption on specific sleep parameters (duration, efficiency, duration) in university students and to discuss the impact on students' health and academic performance.

2. REVIEW METHODS

Study Design

To really understand what heavy caffeine consumption does to sleep, we went with a systematic review approach. But nobody likes a messy, untraceable literature search. To avoid that exact problem, we anchored our entire process to the PRISMA guidelines. It is pretty

straightforward. Sticking rigidly to their checklist means anyone else can take our steps and replicate the data collection without second-guessing the process.

Selection of Studies

The study selection process was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Studies that met the preliminary inclusion criteria were then subjected to a full-text review. Any disagreements regarding the eligibility of a study were resolved through discussion and consensus. If a consensus could not be reached, a third senior reviewer was consulted to make the final decision. The reasons for excluding full-text articles were documented and are presented in the PRISMA flow diagram (Figure 1).

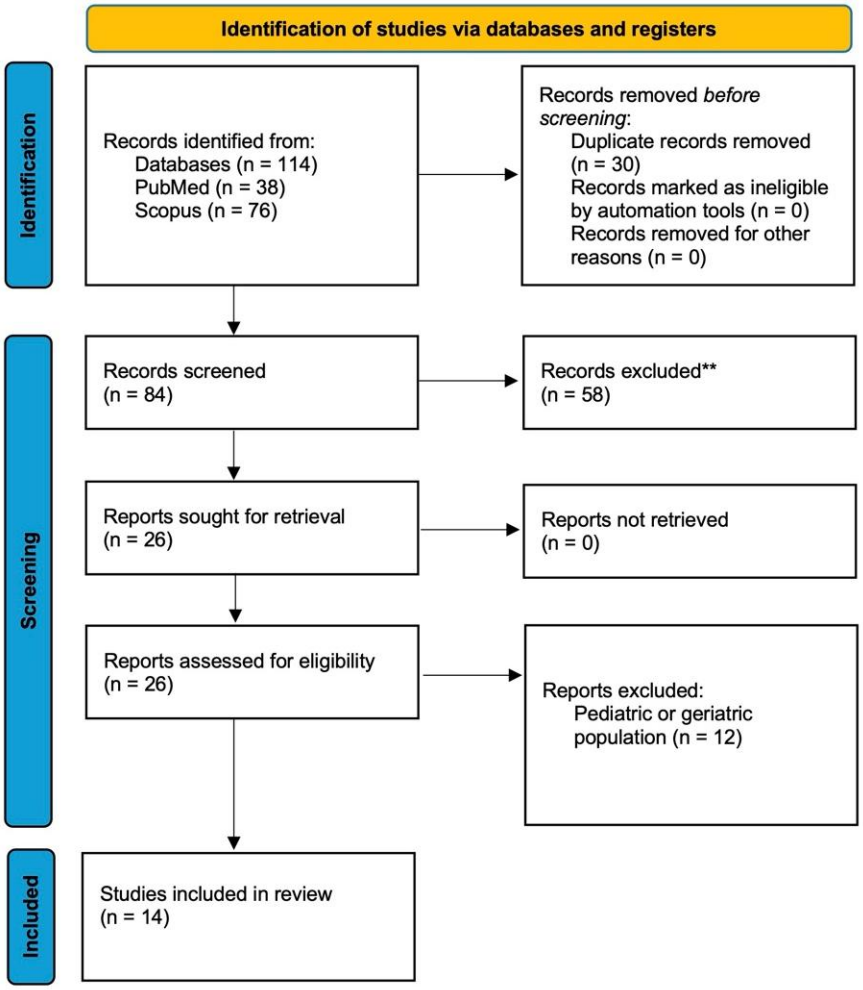

Figure 1. PRISMA flow diagram detailing the literature search, screening, and selection process for the narrative review.

Search Strategy

Finding the right papers meant scanning PubMed/MEDLINE, Scopus, and Google Scholar. We set a hard cutoff at the year 2000. Going back any further made no sense. Commercial energy drinks were not a massive global phenomenon back then. The search strings themselves relied heavily on strict Boolean operators. We merged rigid MeSH terminology with much looser free-text phrases. Every paper included in this review had to meet three specific criteria at once. First, the focus had to be on stimulants—specifically energy drinks or other caffeinated beverages. We also narrowed the scope to university-aged students and young adults to keep the data relevant. One last major requirement was that every study had to get into the weeds with sleep-specific results—stuff like insomnia, overall sleep quality, or even those shifts in circadian rhythms. If a paper did not manage to hit all three of these core areas at once, it simply did not make the cut for the final analysis.

Inclusion and Exclusion Criteria

To be fair, we were actually really picky about which studies made it into this review, and you can see all those specific ground rules we followed in Table 1. The absolute main thing for us was the demographic—every single paper we used had to zero in specifically on university or college students. If a study grouped students in with other age groups without giving us any separate data for them, it was basically an automatic dealbreaker for us.

Table 1. Summary of inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Studies investigating the impact of energy drinks on sleep parameters (quality, duration, latency).	Studies focusing on unrelated outcomes (e.g., exclusively cardiovascular effects without sleep data).
Target population: University/College students (typically aged 18-25).	Target population: Children, adolescents, or elderly.
Peer-reviewed original research and systematic reviews.	Case reports, grey literature, non-peer-reviewed articles.
Full text available in English.	Animal models (e.g., rat studies).

We mainly looked for original research like cohort studies, longitudinal tracks, or cross-sectional analyses. We did consider systematic reviews, too but only if they were very clear about their methodology. On top of that, we only selected papers that gave us concrete data on sleep—things like PSQI scores, total sleep time, or how long it took to fall asleep (SOL). To keep the quality high, we stuck to peer-reviewed journals and only looked at articles published in English.

Exclusion Criteria

We excluded studies that focused solely on pediatric or geriatric populations. The way children or older adults respond to stimulants, along with their very different sleep requirements, makes them poor comparisons for college students. Animal studies were not included in the main analysis; they were only referenced when it was necessary to explain the biological mechanisms of caffeine or taurine.

We also made a point to cut out certain documents that did not meet our quality bar. This decision meant skipping over things like case reports, editorials, and opinion pieces—they just are not reliable enough for this kind of work. We also decided against using conference abstracts; they are almost always too short to provide the kind of raw data we were looking for.

3. RESULTS & DISCUSSION

Selection of Studies

Our first stage of database searches pulled in a massive amount of literature, which just goes to show how much academic interest there is in the energy drink industry right now. We started by cleaning up the list—tossing out duplicates and screening titles—and then moved into a much more intensive full-text review. By the time we finished filtering everything, we identified exactly 14 studies that met all our requirements. These papers form the core of this review, and you can see the whole selection process mapped out in Figure 1.

Impact on Quantitative Sleep Parameters

The reviewed literature provides compelling evidence that ED consumption is detrimental to sleep architecture. The effects are observable across three key quantitative domains:

Sleep Latency (SOL): Just falling asleep takes a lot more time. When you realize caffeine hangs around in your system for 3 to 7 hours, it makes perfect sense. If you crack open an energy drink in the late afternoon, your blood caffeine levels are still going to be sky-high when you try to go to bed. With your adenosine receptors completely blocked, your brain gets trapped in overdrive. You end up in this miserable loop—dead tired, but physically unable to just drift off (Kaldenbach et al., 2024; Reissig et al., 2009).

Total Sleep Time (TST): Unsurprisingly, drinking more energy drinks means logging fewer hours in bed. People who ignore them completely just sleep better—and longer—than regular consumers. A massive survey called the SHOT22 study really drove this point home. It turns out that having an energy drink every day shaves about 30 minutes off your night (Kaldenbach et al., 2024). When you

let that run for a full week, you rack up a 3.5-hour sleep deficit. That is easily enough to ruin your ability to focus and severely damage your reaction times.

Sleep Efficiency (SE): Spending eight hours in bed does not mean much if your sleep quality is garbage. High doses of caffeine seriously fragment your sleep, meaning you wake up way more often during the night (researchers track this as WASO) (Choi, 2020; Sanchez et al., 2013). Students basically wake up repeatedly and have to fight to get back to sleep. This fragmentation obviously wrecks their overall Sleep Efficiency—the percentage of time actually asleep versus just lying there. Worst of all, this constant tossing and turning messes up the natural rhythm of REM and deep sleep, essentially robbing the brain of any real recovery.

Subjective Sleep Quality and the PSQI

The hard metrics only tell part of the story. Even when researchers step away from the clinical data and simply ask students how rested they feel, the results remain remarkably bleak. Across the board, those who regularly consume energy drinks rate their own sleep quality far worse than their peers who avoid them. Multiple studies utilizing the Pittsburgh Sleep Quality Index (PSQI)—a validated clinical tool—have found that ED consumers are more likely to be classified as "poor sleepers" (PSQI score > 5). Research conducted among medical and nursing students (Alshumrani et al., 2023; Alsunni & Badar, 2019; Higbee et al., 2022) is particularly revealing.

We observed an interesting paradox among these students. Although many of them study human health and understand basic principles of physiology, energy drink consumption among this group remains high. Their PSQI results often reflect this pattern, indicating generally poor sleep quality.

Health awareness, as this situation shows, does not always translate into healthier daily habits. The combination of academic pressure, heavy workloads, and the need for high productivity strongly encourages students to rely on caffeinated beverages. When academic demands rise, the intake of energy drinks tends to go up as well. Students utilize them as a coping strategy for fatigue and stress, although these same factors—stress, caffeine use, and lack of sleep—can reinforce each other and negatively impact sleep quality (Higbee et al., 2022).

The Vicious Cycle of Consumption

There is a clear and significant correlation between energy drinks and bad sleep basically just feed into one another. It is a constant loop. Sexton-Radek et al., (2025) used the term "vicious cycle" to describe it, and when you see the data, that really is the only way to put it. It is a pattern that keeps repeating itself.

It usually kicks off with a simple lack of sleep—maybe a student was up late cramming for an exam or just out with friends. To actually get through the next day, they end up grabbing an energy drink to "mask" that fog, but the problem is that those stimulants stay in the system way longer than most people realize. This biological delay ends up wrecking their sleep quality that night, so by the time the next morning rolls around, they are feeling even worse. They then need an even bigger dose of caffeine just to function, creating a heavy reliance that is really tough to break. You can see this whole messy process mapped out in Figure 2.

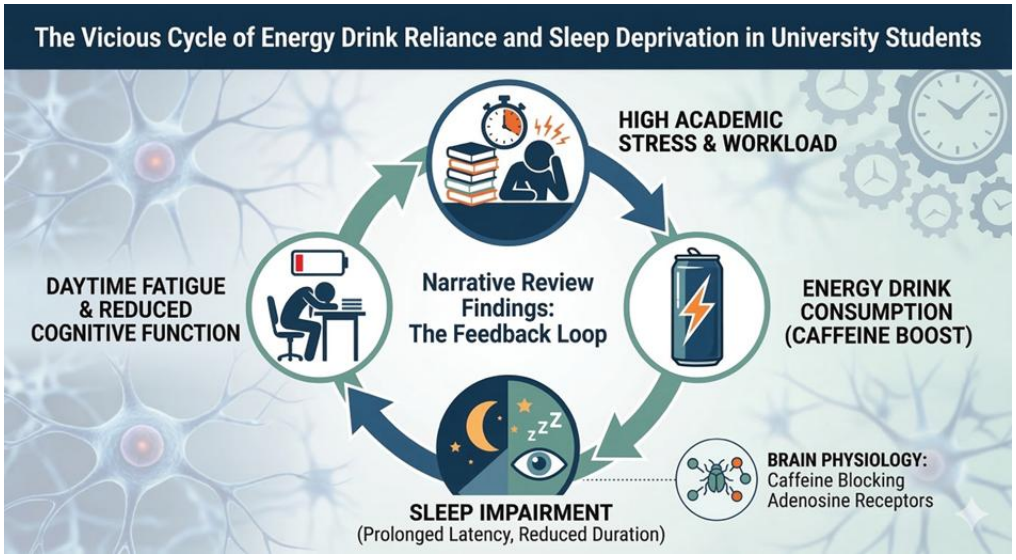

Figure 2. The Vicious Cycle of Energy Drink Reliance.

Conceptual model demonstrating the self-perpetuating feedback loop between academic workload, caffeine consumption, neurological sleep blockade (adenosine receptors), and resulting daytime cognitive dysfunction in university demographics. This diagram synthesizes the core findings of the narrative review.

Over time, the body basically gets used to the caffeine, and that is where the real trouble starts with physical tolerance. To even feel that first "kick" of energy they are looking for, a student ends up having to drink way more than they used to. This heavier intake just wrecks their sleep baseline even further—often trapping them in a state of chronic insomnia that is honestly hard to shake (Al-Haddad et al., 2021; Reissig et al., 2009).

The Other Side Effects: Mental Health and Alcohol

The damage definitely does not stop at just having a ruined night of sleep. When you actually dig into it, pounding these drinks brings a ton of extra baggage. It leaks right into how a student is feeling mentally, not to mention the seriously sketchy choices they might make when alcohol gets involved. It is basically a package deal at this point—you really cannot separate the daytime fatigue from the bad decisions.

Mental Health: It is no secret that bad sleep acts as a revolving door for anxiety and depression. It triggers them, and it is a symptom of them. When researchers look at heavy ED users, the anxiety and depression scores predictably spike (Alsunni & Badar, 2019; Kaldenbach et al., 2024). these beverages strongly stimulate the nervous system. The resulting palpitations, racing heart, and general jitters can actually trick a susceptible person is body into a full-blown panic attack. That obviously ruins any chance of falling asleep normally.

Alcohol Mixing (AmED): Mixing booze with energy drinks is a massive, highly specific campus issue. As Patrick et al., (2018) pointed out, AmED destroys sleep patterns much faster than alcohol does by itself. The underlying reason is entirely biological. Alcohol usually makes you sleepy, right? Well, massive caffeine doses mask that feeling entirely. You get students who are "wide-awake drunk." Naturally, they stay out much later before finally going to bed. Add in the fact that both liquids force heavy diuresis. The resulting physiological crash completely obliterates normal sleep architecture.

Differences by Gender and Demographics

Nobody gets a free pass when it comes to energy drinks ruining sleep. But why do students actually grab a can in the first place? That depends heavily on gender. Men usually down these beverages way more frequently—and in much larger amounts. They are typically after a quick physical boost or just seeking a thrill (Riera-Sampol et al., 2022). Women treat energy drinks differently. For female students, it is usually a blunt tool to survive a brutal study grind. Or, in some cases, a quick way to suppress an appetite.

Then there is the actual biology of it, and a lot of it just comes down to your genes. There is this specific enzyme called CYP1A2—it is basically what decides how fast your body can actually process caffeine. If you are a "slow metabolizer," you are kind of in trouble. For people with that specific trait, even a tiny bit of caffeine is more than enough to completely mess with their sleep architecture for the whole night (Riera-Sampol et al., 2022). The key characteristics and primary sleep-related findings of these 14 studies are summarized in Table 2.

Table 2. Summary of key characteristics and sleep-related outcomes of the included studies.

Study (Author, Year)	Methodology & Sample (N)	Key Findings (Sleep Parameters)	Main Conclusion
Kaldenbach et al., (2024)	Cross-sectional; Norway (N=53,266)	Clear dose-response relationship; daily consumption linked to insomnia and <6h total sleep time.	Even occasional consumption significantly reduces overall sleep duration.
Alshumrani et al., (2023)	Cross-sectional; Medical students (N=403)	Significant negative correlation between ED frequency and global sleep quality (PSQI).	High caffeine intake is a primary risk factor for chronic sleep disturbances.
Higbee et al., (2022)	Descriptive; Nursing students (N=247)	Caffeine intake associated with increased subjective stress and poorer sleep quantity/quality.	Energy drink use degrades both the duration and the restorative quality of rest.
Choi (2020)	Descriptive; South	Academic motivation drives	Motivation-based ED use

	Korea (N=260)	consumption, which severely disrupts sleep architecture and duration.	leads to a critical reduction in total sleep hours.
Alsunni & Badar (2019)	Cross-sectional; Medical students (N=400)	High prevalence of insomnia and palpitations reported among regular ED consumers.	Students utilize EDs as academic aids, resulting in significant nocturnal insomnia.
Al-Haddad et al., (2021)	Systematic Review	Synthesis shows EDs provide temporary alertness at the cost of long-term sleep degradation.	The link between EDs and academic success is mediated by impaired sleep hygiene.

Limitations of Current Evidence

When you take a step back and look at the research as a whole, there some pretty clear gaps are that are honestly hard to ignore. The biggest issue, by far, is that the current data is almost entirely made up of cross-sectional studies (Al-Haddad et al., 2021; Choi, 2020; Sanchez et al., 2013). While these formats are great for spotting a trend in the moment, they pretty much block any chance of proving causation. We can see that these two things are happening at the same time, sure, but we cannot definitively say that one is causing the other—and that is a bit of a problem.

- The Causality Loop: Reverse causality is a major threat to these findings. Severely sleep-deprived students frequently self-medicate. They drink caffeine specifically to survive their existing insomnia. The drinks might just be a symptom.
- Biological Reality: Despite the methodology issues, caffeine pharmacodynamics are proven facts. The biological pathway for direct sleep destruction remains highly probable.
- Measurement Tools: Objective tracking is incredibly rare here. Researchers rarely use actigraphy. Polysomnography is equally absent. Instead, the data relies heavily on subjective self-reporting. Recall bias naturally corrupts those answers.

4. CONCLUSION

When you look at all the evidence together, it is honestly pretty hard to ignore how much energy drinks have taken over college life—and the toll they are taking on sleep is massive. It is not just about students staying up a bit later than they should. The research makes it clear that they are actually taking way longer to fall asleep and waking up constantly throughout the night.

What is actually worse, though, is how all of this just drags itself into the next morning. You have got students who can barely keep their heads up in a 9 AM lecture, feeling totally drained, so their first move is to grab another can. They are just trying to "cover up" that heavy fog in their brain, but the whole plan usually goes south pretty fast. It backfires, honestly. Far from actually getting them through the lecture, slamming another drink mostly just shatters whatever focus they had left, leaving them irritable and on edge. Then the cycle starts. You know the one—zero energy to function without the caffeine, yet way too jittery to catch any sleep when night finally rolls around. Trying to snap out of that is incredibly hard. Unless they figure out a way to break the daily routine, we are not just talking about failing classes here. Their actual mental well-being is what is going to pay the highest price down the road.

Recommendations for Campus Action

Educational Push:

Ignored far too often by university administrators is the basic concept of sleep hygiene. Directly into first-year orientations, this topic must be integrated. The remarkably long half-life of caffeine—and the precise ways it shatters nightly rest—is something universities must teach students explicitly.

Campus Policy:

Scrutiny regarding on-campus commerce is severely lacking. To restrict access to hyper-caffeinated beverages in university stores would be a massive, necessary shift in policy. At the very least, demanded by the administration should be clear, unavoidable warning labels detailing insomnia risks.

Future Research:
Crucial for establishing any real causality are randomized controlled trials and longitudinal tracking. Reversible improvements in sleep parameters following a drop in ED intake? That is exactly what the field must determine next. Validating these outcomes, however, will strictly require objective hardware, such as actigraphy.

Acknowledgments
None.

Authors' Contributions
Conceptualization: Jakub Szyszkowski, Izabella Zawadzka
Formal analysis: Brygida Tucka, Tomasz Kucharski, Jakub Jaworski
Investigation: Jakub Szyszkowski, Ewelina Komorowska, Paulina Wądołowska
Writing rough preparation: Zuzanna Zgrzywa, Natalia Kriese, Bartosz Kowalski
Writing review and editing: Jakub Szyszkowski, Tomasz Kucharski
Supervision: Jakub Szyszkowski

Informed consent
Not applicable.

Ethical approval
Not applicable. This article does not contain any studies with human participants or animals performed by any of the authors.

Funding
This research did not receive any external funding like specific grant from funding agencies in the public, commercial, or nonprofit sectors.

Conflict of interest
The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data and materials availability
All data associated with this work are present in the paper.

REFERENCES

1. Al-Haddad M, Omran E, Al-Thani M. The relationship between energy drinks consumption and academic performance among university students: A systematic review. Int J Health Sci (Qassim) 2021; 15: 85–92.
2. Alshumrani R, Shalabi B, Sultan A, Alnefaie A, Almetairy A, Althobaiti A. Consumption of energy drinks and their effects on sleep quality among medical students. J Fam Med Prim Care 2023; 12: 1609–1614.
3. Alsunni AA, Badar A. Energy drinks consumption among medical students in Dammam, Saudi Arabia: A cross sectional study. J Med Educ Curric Dev 2019; 6: 2382900019864230.
4. Choi J. Motivations influencing caffeine consumption behaviors among college students in Korea: Associations with sleep quality. Nutrients 2020; 12: 953.
5. Higbee MR, Gipson CS, El-Saidi M. Caffeine consumption habits, sleep quality, sleep quantity, and perceived stress of undergraduate nursing students. Nurse Educ 2022; 47: 120–124.
6. Kaldenbach S, Hysing M, Strand TA, Sivertsen B. Energy drink consumption and sleep parameters in college and university students: A national cross-sectional study. BMJ Open 2024; 14: e072951.
7. Lemma S, Patel SV, Tarekegn YA, Tadesse MG, Berhane Y, Gelaye B, Williams MA. The epidemiology of sleep quality, sleep patterns, consumption of caffeinated beverages, and khat use among Ethiopian college students. Sleep Disord 2012; 2012: 583510.

8. Patrick ME, Griffin J, Huntley ED, Maggs JL. Energy drinks and binge drinking predict college students' sleep quantity, quality, and tiredness. Behav Sleep Med 2018; 16: 92–105.
9. Reissig CJ, Strain EC, Griffiths RR. Caffeinated energy drinks—a growing problem. Drug Alcohol Depend 2009; 99: 1–10.
10. Riera-Sampol A, Rodas L, Martinez S, Moir HJ, Tauler P. Caffeine intake among undergraduate students: Sex differences, sources, motivations, and associations with smoking status and self-reported sleep quality. Nutrients 2022; 14: 1661.
11. Sanchez SE, Martinez C, Oriol RA, Bazul RY, Castañeda OJ, Gelaye B, Williams MA. Sleep quality, sleep patterns and consumption of energy drinks and other caffeinated beverages among Peruvian college students. Health 2013; 5: 26–35.
12. Sexton-Radek K, Bedolla A, Kaja K, Hartley M. Energy drink use and sleep quality in university students. Health (Irvine Calif) 2025; 17: 679–688.