Energy Drinks

a new potential health hazard for adolescents

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Introduction
- New clinical problem in the area of school health
- Teens are consuming for energy boost.
- Teachers are observing physical effects in the classroom.
- School nurses are seeing increased #’s of students in the health office with adverse S/S.

Background
- Energy drinks contain enough stimulant ingredients to cause a multitude of physical effects.
- Consumption has been linked to seizures, acute mania, and strokes.
- Deaths attributed to energy drink consumption have been reported in Australia, Ireland, & Sweden.
- Few published studies have examined their implications for public health.

Caffeine
- The main ingredient in majority of drinks that adolescents consume
- A stimulant that affects the body by jolting the CNS
- A natural alkaloid methylxanthine, which is 99% absorbed after oral ingestion
- Increases intracellular calcium concentrations, causing noradrenaline release and sensitizes dopamine receptors
- Energizing effect comes from caffeine’s ability to block adenosine from signaling the brain that the body needs to rest.
- Can lead to anxiety, increased blood pressure, and an accelerated heart rate

Other Ingredients
- Guarana
- Sucrose
- Glucose
- Taurine
- Glucuronolactone
- Vitamins
- Flavors
- Other Herbal Supplements
- Coloring
- In combination provide a short-term energy boost and do not constitute suitable sources of rehydration or restoration of electrolytes
Caffeine Intoxication
- Defined by specific symptoms that emerge as a direct result of caffeine consumption
- Overdose may be increased for abstainers of caffeine as well as those who consume caffeine habitually.
- Potential for acute caffeine toxicity may be greater than other dietary sources of caffeine.

Regulation
- FDA recommends that drinks contain no more than 65mg of caffeine per 12oz.
- Energy drinks contain much higher amounts.
- Energy drinks are not required to have labeling that discloses the amount of caffeine.
- FDA does not have the authority to require warning labels on energy drinks.

Energy Drink Industry
- Fastest growing sector of the US beverage industry
- Growing at a rate of 55% per year
- US is the world’s largest consumer by volume of energy drinks.
- Americans drink 3.8 qts per person per year.
- Estimated that market will hit $10 billion in 2010.

Advertising
- Companies deny that they advertise to children
- Aggressive marketing promising psychoactive, performance-enhancing & stimulant drug effects
- Hundreds of different brands are marketed, with caffeine content ranging from 50-500 milligrams per can or bottle
Risks for Adolescents
- Adolescents in school are prime candidates to experience adverse health effects.
- They have not built up the tolerance compared to long-term adult users.
- They are at more risk for caffeine intoxication.
- Genetic factors may also contribute to an adolescent’s vulnerability to caffeine-related disorders including dependence and withdrawal.

Significance for School Nurses
- Important for school nurses to be familiar with energy drinks & potential health consequences assoc. with use
- Recognition of caffeine intoxication, withdrawal, and dependence is important.
- Need to advocate for school policies to prevent availability of energy drinks in school vending machines.
- Promote awareness of health related issues associated with energy drinks

Assessment & Intervention
- Question the use of herbal supplements, energy drinks, alcohol, and standard beverages containing methylxanthines, such as tea, coffee, and cocoa.
- Encourage to abstain from energy drinks
- Reduce soft drink intake among children to prevent excess energy intake & weight issues.
- Identification of heavy users could be a first-line screening mechanism for targeting at-risk adolescents.

Evidence-Based Practice
- Evidence exists that more education and increased awareness is needed regarding potential harmful effects of energy drinks.
- Considerable body of research available on the effects of some of the individual ingredients of energy drinks.
- Very little research has been published on the combined effects of ingredients.
- Few empirical studies have examined the demographics of energy drink consumption in relation to age, gender, and race.
- More research is needed on the health implications of the combined effects of energy drinks.
- Few studies on the subject of caffeine use in children

Consumption Among College Students
- 51% report regular consumption
- Purpose:
  - Insufficient sleep
  - To increase energy while studying
  - Driving long periods
  - Drinking alcohol
  - Treat hangover
High School Students & Sociodemographics

- 6,867 high school students
- Caffeine addiction associated with health and welfare problems
- Males
  - Increased alcohol and drug problems
- Adverse link to health was limited to females
  - Severe stress
  - Chronic depression
  - Overall poor health status

Energy Drink Consumption & Problem Behaviors

- 602 high school and college students
- Consumption was positively associated with
  - Marijuana use
  - Sexual risk-taking
  - Seatbelt omission
  - Taking risks on a dare
  - Smoking, drinking, illicit prescription drug use

Energy Drinks + Alcohol

- 450 students
- 56.9% reported using energy drinks
- 48.4% frequently combined energy drinks and alcohol
- Report that combination reduces adverse symptoms of alcohol intoxication including depressant effects—allowing them to drink more longer

Swiss Mice-Energy Drinks + Alcohol

- Evaluated the effects of different doses of energy drinks combined and not combined with alcohol on physical activity
- Results: Reduction of activity observed after alcohol was antagonized by energy drinks.
- Administration of energy drinks enhanced activity of mice in a dependent way.
- Reduction in depressant effect of alcohol

Reasons for Energy Drink Consumption Among 78 Adolescents

- Prevention of illness
- Energy boost
- Better sports performance
- Not aware of any associated risks

Energy Drinks & BMI Scores

- 164 children
- Significant decreases in milk consumption
- Increased consumption of diet soda consumption
- Increases in diet soda were significantly greater for overweight subjects
**Education Program Results**
- 7-11 year old children in 6 schools
- Beverage intake did not significantly change among children in the control classroom
- Significant decrease of overweight in the intervention class as well as decrease in consumption of caffeinated beverages
- Reveals a link of soft drinks to obesity in children

**Cognitive Performance**
- 9-11 year old children
- Habitual users of caffeine—poorer cognitive test scores compared to non-consumers
- Administration of caffeine improved the accuracy on cognitive tests
- Signs and symptoms of withdrawal in habitual users—reversed by subsequent caffeine consumption

**Headaches**
- Caffeine has the potential to have an antagonist effect on adenosine receptors which can cause effects similar to that of an analgesic—lead to onset or relief of headache depending on site of action, amount consumed, and timing of consumption
- Reduction of caffeine reduces risk of developing caffeine related headaches

**Sleepiness**
- 10 sleep restricted participants ate lunch, consumed caffeine, followed by 3 thirty-minute consecutive periods at a reaction time task separated by 3-minute breaks—rate sleepiness
- Results: No counteraction of sleepiness
- Little support that caffeine can have benefit on a sleepy brain

**Case Report**
- 23 y.o female with no medical hx brought to ED with heart palpitations and chest tightness following consumption of 1 energy drink and 1 other caffeinated beverage.
  - B/P: 120/55 P: 219 BPM
  - Carotid massage and Valsava maneuvers were unsuccessful in reversing tachycardia
  - Adenosine-6mg IVP—converted to NSR

**Case Report**
- 4 patients with new-onset seizures following consumption of energy drinks
- No seizures once the patients were abstinent from the energy drinks
- Possible association of energy drinks to new-onset seizures
Applying the Evidence

- More education is needed
- Ban from school vending machines
- Assess adolescents of use during physical exams and assessments
- Warn about the dangers
- Discuss alternative ways to increase energy levels: good nutrition, adequate rest, and regular physical activity
- Policies regarding use by athletes

Conclusion

- Health hazards have been associated with the consumption of energy drinks.
- School nurses can apply these findings to inform and educate children and adolescents.
- Interventions to reduce consumption could be effective in preventing negative health effects in children and adolescents.
- The elimination of energy drinks has the potential to prevent negative health effects in children and adolescents.

References


References