Energy Drinks: Lessons Learned from Military Populations

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• Opinions are mine. They do not reflect official policy of DoD, USU, DoN or any other federal entity
• No other conflicts
Background

• 4 of 5 Americans regularly use caffeine
• Half of US college students use ED
• ED users in the military are younger, of lower rank and have completed less formal schooling than those consuming other caffeinated beverages
Systematic Review-Adults

- “The findings from this review do not allow definitive dietary recommendations to be made regarding safe levels of ED consumption; caution should be exercised when consuming these drinks until further high-quality research is undertaken to substantiate findings”

Adolescents

• “Energy drinks have no therapeutic benefit, and many ingredients are understudied and not regulated. The known and unknown pharmacology of agents included in such drinks, combined with reports of toxicity, raises concern for potentially serious adverse effects in association with energy drink use. In the short-term, physicians need to be aware of the possible effects of energy drinks in vulnerable populations and screen for consumption to educate families. Long-term research should aim to understand the effects in at-risk populations. Toxicity surveillance should be improved, and regulations of energy drink sales and consumption should be based on appropriate research”

Pediatrics

“Although prior studies have examined the effects of caffeine in adolescents, energy drinks should be considered a novel exposure. The high doses of caffeine, often in combination with ingredients with unknown safety profiles, mandates urgent research on the safety of energy drink use in children and adolescents. Regulation of pediatric energy drink use may be a necessary step once the health effects are further characterized.”

Military (uniquely at risk!)

- 45% of deployed consumed at least one ED daily
- 14% drinking three or more a day!
  - More likely to report sleeping ≤4 hours a night.
  - More likely to report sleep disruption related to stress
  - More likely to fall asleep on guard duty

“Service members should be educated regarding the potential adverse effects of excessive energy drink consumption on sleep and mission performance and should be encouraged to moderate their energy drink consumption in combat environments”

MMWR Nov 2012
Background

• Prospective survey to quantify energy drink/shot use in samples of active duty military members

• Ascertain side effects
• Determine reasons for use
• Compare different military ‘communities’
Methods

• 23-item survey
• Email distribution
• Qualitative/Descriptive

• Promote student research
Preliminary Data

- Professional society (MD/DO; n = 131)
- Air Assault Base (n = 278)
- Graduate School (n = 169)
  - Faculty & Students
Results--Demographics

- 75% male
- 95% active duty
- 41% enlisted; 58% officer; 1% no data
- 63% Army; 18% Navy; 17% Air Force; 2% USMC; USCG; PHS
Results-Age

45-49 (7%)
50-54 (3%) >55 (2%)
40-44 (10%)
35-39 (13%)
30-34 (16%)
18-24 (21%)
25-29 (28%)
Use in Past 30 days

53% of respondents reported use in past 30 days
Reasons for Use

• Energy boost (45%)
• Mental alertness (36%)
• Refreshment (18%)
• Athletic performance (9%)
• Hydration (6%)
• Relaxation (4%)
• Weight Management (2%)
Use of Energy Drinks with Alcohol

- I did not consume any energy drink in combination with an alcoholic beverage in the past 30 days (81%)
- 2-3 days in the past 30 days (4%)
- Once in the past 30 days (6%)
- 1-2 days a week (4%)
- 3-4 days a week (1%)
- 5-6 days a week (2%)

AmED vs AMEDD??!!
Product Safety

Do You feel these products are safe?

- yes
- no
- unsure
- do not know

E1-E3
E4-E6
E7-E9
O1-O3
O4-O6
O7-O10
Self-Reported Effects

- None (37%)
- Increased mental alertness (36%)
- Increased HR (20%)
- Increased mental endurance (17%)
- Restlessness (14%)
- Difficulty sleeping (14%)
- Improved physical endurance (12%)
- Dehydration (10%)
- Nervousness (7%)
- Heart palpitations (6%)
Composite findings

ED use common (> 50%)
Frequent ED (>1/day) use more common in lower ranks
20% of respondents AmED use
Drinks/shots were consumed primarily to boost energy and increase mental alertness
Tachycardia, restlessness and sleep difficulties most common adverse side effects
Lower ranks more likely to think safe
Physician Cohort

- Same 23 item survey and methodology
- 131 of 1997 primary care physicians
  - ACGME 80hr week
Results (Physician cohort)

• 27% prior use of ED/ES (vs >50%)

• Reasons for use
  • Energy boost (21%)
  • Mental alertness (18%)
  • Refreshment (5%) **audience participation**
  • Athletic performance (5%)
  • Hydration (2%)
  • Weight management (2%)
Results (Physician cohort)

• Side Effects
  • None (44%)
  • Increased mental alertness (21%)
  • Increased mental endurance (10%)
  • Palpitations (7%)
  • Increased HR (6%)
  • Sleep difficulty (7%)
  • Restlessness (5%)
  • Increased physical endurance (4%)
  • Nervousness (4%)
  • Headaches (4%)
Results: Physician knowledge

- 47% felt ‘not safe’; 25% unsure of safety
Summary Findings (Physician Cohort)

• Physician use lower
• Side effects and reasons for use similar
• Some use despite safety concerns
Limitations

- Poor response rate
- ? Generalizability
Shared Lessons

• Youth/adolescent ‘high-risk’ population
• Reasons for use are predictable
  • Motivational interviewing?
• Side effects are predictable
  • *Where there is smoke there is fire!*
• Role of Patient Centered Medical Home
  • Access to care; anticipatory guidance
Acknowledgements

• Dr. Patricia Deuster
• Dr. Donnamaria Jones
• Selasi Attipoe

• Dr. Zach Bevis
• Alyssa Zuehl
• Eric Jones
• Dr. Liam Delahanty
Describe the Adverse Event that Occurred:
Pt reported he missed the N.O. Amplified with Lightning Energy Drink because he did not have any water in his room. After 25 minutes of lifting in the gym, he experienced swollen lips, swollen throat and difficulty breathing. Pt denied chest pain. Pt was hospitalized overnight and discharged back to his unit.

Outcomes that apply to this adverse event:
Hospitalization, either initial or prolonged

Date of event: 11/8/12

List any relevant laboratory data (e.g. liver function tests, renal function, WBCs, etc.):
Upon admission: glucose 217, BUN22, Creat 1.7, Na 133, Cl 96, Mg 1.5, CK 453. Labs 7 hours later were WNL.

Ingredients:  Thiamine, Riboflavin, Niacin, Vitamin B6, Folic Acid, Vitamin B12, Biotin, Pantothenic Acid, Calcium, Potassium, Betaine, Beta-Alanine, L-Leucine, L-Isoleucine, LValine, L-Arginie, L-Citrulline Malate, Yohimbe, Grape Seed, Dicreatine Malate, Creatine Ethyl Ester HCl, Guanidinoacetate, Creatine, L-Arginine, L-Glycine, L-Methionine, Caffeine Anhydrous, Medium Chain Triglycerides, L-Carnitine
3. Why do you prefer your favorite brand?

These statistics are percentages of responses for only those who reported energy drink usage.

- I prefer the way it tastes 69.49%
- This one gives me more energy than other brands I've tried 4.66%
- My friends drink this brand 2.54%
- I like the way the can looks 0.42%
- This drink has the highest "cool" factor 1.69%
- Other 21.19%

Please list other reasons here:
Examples include price, availability, and health reasons such as lower calories, less jitters, more vitamins, etc.

4. How long have you consumed energy drinks?

- A few months 8.37%
- 1-3 years 37.02%
- 4-6 years 18.63%
- more than 6 years 6.46%
- I do not regularly consume energy drinks 28.52%
1. How often do you consume "energy drinks" such as Red Bull, Monster, Viper, etc? (Please select. If you answered “never” you may skip to item #9).

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Never</td>
<td>38.46%</td>
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<tr>
<td>Rarely (less than 1 per week)</td>
<td>30.50%</td>
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<tr>
<td>Occasionally (1-6 per week)</td>
<td>23.61%</td>
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<tr>
<td>Regularly (1-2 per day)</td>
<td>5.57%</td>
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<tr>
<td>Frequently (&gt;3 per day)</td>
<td>1.33%</td>
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</tbody>
</table>

61.01% Report Energy Usage with 30.50% reporting Usage at Least once per Week.

377 Total Surveys are included in this summary

2. Please rank-order your top three brands. If you only drink one or two brands, only name one or two.

<table>
<thead>
<tr>
<th>First Choice</th>
<th>223 Responses</th>
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<tbody>
<tr>
<td>Monster</td>
<td>32.29%</td>
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<tr>
<td>Red Bull</td>
<td>30.04%</td>
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<tr>
<td>Rockstar</td>
<td>10.31%</td>
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<tr>
<td>Full Throttle</td>
<td>7.17%</td>
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<tr>
<td>Rip It</td>
<td>2.69%</td>
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<tr>
<td>Amp</td>
<td>2.69%</td>
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<tr>
<td>Sobe No Fear</td>
<td>3.14%</td>
</tr>
<tr>
<td>XS</td>
<td>2.24%</td>
</tr>
<tr>
<td>Starbucks Shots</td>
<td>0.90%</td>
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<tr>
<td>Other</td>
<td>8.52%</td>
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</table>

<table>
<thead>
<tr>
<th>Second Choice</th>
<th>159 Responses</th>
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<tr>
<td>Monster</td>
<td>21.38%</td>
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<tr>
<td>Red Bull</td>
<td>35.22%</td>
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<tr>
<td>Rockstar</td>
<td>13.84%</td>
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<td>Full Throttle</td>
<td>8.81%</td>
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<tr>
<td>Rip It</td>
<td>1.89%</td>
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<td>Amp</td>
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<td>Sobe No Fear</td>
<td>4.40%</td>
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<td>XS</td>
<td>0.00%</td>
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<tr>
<td>Starbucks Shots</td>
<td>2.52%</td>
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<tr>
<td>Other</td>
<td>9.43%</td>
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<table>
<thead>
<tr>
<th>Third Choice</th>
<th>61 Responses</th>
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<tbody>
<tr>
<td>Monster</td>
<td>24.59%</td>
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<tr>
<td>Red Bull</td>
<td>27.87%</td>
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<td>Rockstar</td>
<td>6.56%</td>
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<td>Full Throttle</td>
<td>13.11%</td>
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