Reviewer's report

Title: A survey of energy drink consumption patterns among college students

Version: 3 Date: 17 May 2007

Reviewer: Delia Smith West

Reviewer's report:

General
The manuscript uses survey methodology to describe the intake patterns of energy drinks among college students. This is a growing beverage niche and little is known about the intake patterns within this particular population segment and therefore the manuscript is of interest. There are, however, significant limitations or weaknesses in the manuscript that diminish the potential scientific and public health contribution offered by these data. Many of these concerns are remediable, and the authors are encouraged to consider revising.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

The main limitations are outlined below. They are all major compulsory revisions, which unless remediated result in a manuscript that has minimal scientific value. Given the critical and broad nature of the required revisions, only the major compulsory revisions are highlighted in this review.

1) The results are presented in a misleading fashion. Only 54% of the 253 students surveyed reported at least one energy drink in the previous month and thus met the criterion set by the authors as “an energy drink user.” Thus, all analyses and tables that consider “energy drink users” (e.g. all tables in the manuscript and the majority of the chi square analyses conducted) should be restricted to those individuals who met the criterion of energy drink user (N=253 x .51 = 129) rather than the entire sample, as is currently reported. This will significantly alter the results and the conclusions presented. For example, it would not seem accurate to say that 54% of college students surveyed consumed energy drinks while partying when only 51% of them even consumed energy drinks (and not all of them reported partying as a situation in which they drank). It would seem more likely that 54% of those reporting intake indicated that parties were a common situation, with only ~27% of students surveyed indicating that they consumed energy drinks while partying (253x.51x.54 = 70 individuals or 27% of 253). I belabor this example only to make clear the logical error that is common to all the results presented, which also appears to drive the substantial overgeneralization of the results in the discussion and conclusion.

2) The assessment measure is inadequately described. No one could replicate the study based on the description offered and this is a significant weakness. The response categories are not well outlined, especially for questions on side effects. Frequency patterns of intake were asked by situation without any indication that unique and distinct events were being assessed. This is critical because the authors treat intake in situations as independent, without discussion of the potential overlapping events that would inflate the scope of the problem. For example, if partying and lack of sleep correspond, one could respond that one has an energy drink at a party AND to deal with lack of sleep and it could be the same single energy drink that was being reported rather than two unique events. The authors need to clarify how the questions were asked (perhaps by giving examples of the survey items) and how they considered the situational categories. If they failed to get a measure of self-reported total intake over the period in question (past month), this should be included in the discussion as one of the limitations. If they collected the information, it should be provided in the results. Furthermore, in table 2 which provides categories for energy drink consumption, there is no category offered of zero. How then did the 49% of survey respondents who indicated that they had not consumed an energy drink in the previous month so indicate. Was 0 a response choice offered that was not included on the table? If so, why was that category omitted from the data presentation?

3) The authors fail to report (and even perhaps gather) salient demographic data that would allow the reader to identify the population to which these data can be generalized. What was the race/ethnic composition of the sample? What age group was included in the sample (non-traditional college campuses can have older student bodies while more traditional campuses have students in the 19-20 year old range)? What was the mean age of participants?

4) The discussion section generalizes beyond the scope of the data and needs to be tempered. In particular, the discussion of the negative side effects of energy drinks and the public health concern. Given
the lack of a control group, there is little evidence to support that these side effects are significantly greater than those that would be observed in this population with a placebo. Caffeine has some physiological impacts that would provide biological plausibility for the conclusions the authors reach, but their data do not provide conclusive data to support the contention. A further significant weakness to the discussion section is the failure to identify and discuss the critical limitations to the study (the self-report nature of the data, the lack of identifying information to ascertain whether given individuals completed the survey on multiple occasions and are therefore counted more than once in the data, the failure to have serving size information), particularly with respect to how the limitations might temper the conclusions.

5) The introduction is replete with language that makes broad and unsubstantiated claims, much as one might read in popular press rather than in a scientific article. This language must be changed or references to support the claims being made must be provided. For example, “…this versatile new breed of concoction “liquid candy” with extra caffeine is becoming the “pick-me-up” of choice and a necessary partying accessory that enhances the alcohol buzz.” (1st paragraph of background). There are no references to support any of these claims – that it is the pick-me-up of choice, necessary for partying, etc. Further claims about consumer beliefs, constant stress among college students, etc. are all claims that have no evidence offered to support them and should either be referenced or deleted.

6) The abstract needs significant revision in accordance with most of the comments made above. The results are misleading, the introduction waxes poetic but has no evidence to support many of the claims, the findings are overgeneralized and the analyses appear to have used the wrong N for stated research questions.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)

What next?: Reject as not sufficiently sound

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.