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Sociodemographic Correlates of Energy Drink Consumption With and Without Alcohol: Results of a Community Survey

Lisa K. Berger, PhD¹, Michael Fendrich, PhD¹, Han-Yang Chen, MS², Amelia M. Arria, PhD³, and Ron A. Cisler, PhD^{1,2}

¹ Center for Addiction and Behavioral Health Research, Helen Bader School of Social Welfare, University of Wisconsin-Milwaukee, 2400 E. Hartford Avenue, Milwaukee, Wisconsin 53211 USA

² Center for Urban Population Health, University of Wisconsin School of Medicine and Public Health, Aurora Health Care, and University of Wisconsin-Milwaukee, 1020 North 12th Street Suite 4180, Milwaukee, Wisconsin 53233 USA

³ Center on Young Adult Health and Development, University of Maryland School of Public Health, Department of Family Science, 1142 School of Public Health, College Park, MD 20742 USA

Abstract

Objective—We examined the sociodemographic correlates of energy drink use and the differences between those who use them with and without alcohol in a representative community sample.

Methods—A random-digit-dial landline telephone survey of adults in the Milwaukee, Wisconsin area responded to questions about energy drink and alcohol plus energy drink use.

Results—Almost one-third of respondents consumed at least one energy drink in their lifetime, while slightly over 25% used energy drinks in the past year and 6% were past-year alcohol plus energy drink users. There were important racial/ethnic differences in consumption patterns. Compared to non-users, past-year energy drink users were more likely to be non-Black minorities; and past-year alcohol plus energy drink users when compared to energy drink users only were more likely to be White and younger. Alcohol plus energy drink users also were more likely to be hazardous drinkers.

Conclusions—Our results which are among the first from a community sample suggest a bifurcated pattern of energy drink use highlighting important population consumption differences between users of energy drinks only and those who use alcohol and energy drinks together.

Keywords

energy drink; alcohol drinking pattern

1. Introduction

Energy drink consumption has been growing in popularity as evidenced by new energy drink products flooding the beverage market. From 2004 to 2009, the introduction of new energy drink products was up by over 110% (Mintel GNPD, 2009), and the 2009 retail

market for these products was valued at \$4.6 billion (Mintel Oxygen, 2009a). Since the debut of energy drinks in the US in 1997 with the introduction of Austrian-import Red Bull® (Dolan, 2005), energy drink companies have acquired 34.5 million consumers as of 2008 (Mintel Oxygen, 2009b), most of whom are teenagers and young adults (Heckman, Sherry, & Gonzalez de Mejia, 2010; Mintel Oxygen, 2009a; Mintel Reports, 2008).

Energy drinks such as Red Bull®, Monster®, Amp®, Rockstar®, and Full Throttle® are designed to provide an energy boost to consumers through the combination of primarily caffeine and other ingredients such as taurine, an amino acid (O'Dea, 2003; Simon & Mosher, 2007). Caffeine can produce dependence (Griffiths & Chausmer, 2000), and at higher doses, and for some individuals can have negative health consequences such as increased anxiety and blood pressure, gastrointestinal disturbances, and insomnia (Reissig, Strain, & Griffiths, 2009; Simon & Mosher, 2007). Energy drinks typically have high concentrations of caffeine. Relative to a cup of brewed coffee, which has 100 mg of caffeine, the range of caffeine contained in energy drinks is 80 to 174 mg or higher per energy drink container (Babu, Church, & Lewander, 2008; Reissig et al., 2009; Simon, & Mosher, 2007). As a result, food safety officials outside the U.S. have issued regulations on the use of energy drink products to protect those potentially at-risk from excess caffeine consumption (Evira, n.d.; Prevention Directorate, 2006).

1.1 Energy Drinks and Alcohol

Recently, public health and safety officials have expressed concerns about the health consequences of combining alcohol and energy drinks into a single alcoholic beverage, including pre-mixed alcoholic energy drinks (Arria, O'Brien, Goldberger, Griffiths, & Miller, 2009; Blumenthal, Shurtleff, & Limtiaco, 2009; CSPI, 2008; FDA, 2009; Mertens, 2009; Simon & Mosher, 2007). For example, in 2009 the Food and Drug Administration requested safety data from manufacturers of pre-mixed alcoholic energy drinks (FDA, 2009). Marketing practices suggest that caffeine can counteract the intoxicating effects of alcohol (Simon & Mosher, 2007), but energy drink use does not significantly reduce alcohol-induced deficits (Ferreira, de Mello, Pompeia, & de Souza-Formigoni, 2006). College students who consume both alcohol and energy drinks together have a higher risk of experiencing alcohol-related adverse consequences (O'Brien, McCoy, Rhodes, Wagoner, & Wolfson, 2008; Thombs et al., 2010). Furthermore, frequency and quantity of energy drink use among college students is associated with alcohol consumption and negative events (Arria, Caldeira, Kasperski, Vincent, Griffiths, & O'Grady, in press; Malinauskas, Aeby, Overton, Carpenter-Aeby, & Barber-Heidal, 2007; Miller, 2008a).

1.2 Present Study

While an emerging body of research underscores the problematic nature of energy drink use, major limitations are noted. To date, this research has focused primarily on non-probability samples of college students. Our study fills an important gap by focusing on a community-based probability sample of adults drawn from an area of the country characterized by a relatively high prevalence of alcohol use and related problems. Because this study is among the first to look at energy drink use in a community sample, we focused on basic sociodemographic correlates of use. The aims of the present study were to: (1) estimate the adult prevalence of energy drink use both with and without alcohol in a community sample; (2) compare past-year energy drink users and past-year non-energy drink users on basic sociodemographic characteristics; (3) compare past-year alcohol plus energy drink users and past-year energy drink users only on these same characteristics; and (4) to examine the association between alcohol plus energy drink use and hazardous drinking.

2. Method

The study sample was comprised of individuals aged 18 or older who participated in the 2008 Greater Milwaukee Survey, a semi-annual cross-sectional random-digit-dial landline telephone survey of household residents in the Milwaukee, Wisconsin Metropolitan Statistical Area. In total, 946 adults aged 18 to 92 participated in the survey for a response rate (AAPOR, 2009) of 20.9%. Survey data were weighted based on American Community Survey estimates for 2007 (US Census Bureau, 2008).

The main study measures were questions about energy drink use and the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) (Dawson, Grant, Stinson, & Zhou, 2005; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The energy drink questions, designed specifically for this study, ask about use patterns including alcohol plus energy drink use at the same time. The AUDIT-C (Dawson et al., 2005) (scale range 0–12) assesses past year frequency and quantity of alcohol use in standard drink units (NIAAA, 2005). A score of 4 or higher indicates hazardous drinking (Dawson et al., 2005).

Survey weights were employed to adjust for sampling methodology and non-response. Point estimate, chi-square, and logistic regression analysis were used to examine the study aims. SAS 9.2 (SAS Institute, n.d.) was used to conduct all analyses.

3. Results

Almost one-third of all respondents (31.4%; 95% confidence interval [CI] 28.5, 34.4) used energy drinks in their lifetime, and over one fourth (26.3%; 95% CI 23.5, 29.2) used energy drinks in the past year whereas just over 6% (6.3%, 95% CI 4.8, 7.9) were past-year alcohol plus energy drink users. When considering just past-year energy drink users, however, approximately 20% (21.0%; 95% CI 18.4, 23.6) used alcohol plus energy drinks at the same time.

With respect to sociodemographic characteristics of past-year energy drink users and past-year non-energy drink users, chi-square analysis (not shown here) revealed that energy drink users were significantly more likely to be male, non-Black minority, younger (18–29 years old), and living in the city of Milwaukee than non-energy drink users. Energy drink users also were more likely to be either high school educated or with some college, employed, single, and to have children in the household in comparison to non-energy drink users.

With respect to comparisons between past-year alcohol plus energy drink users and past-year energy drink users only, chi-square analysis (not shown here) revealed that alcohol plus energy drink users were significantly more likely to be younger (18–29 years old), unemployed, single, and to have moderate household incomes (\$30,000 to \$59,999) than energy drink users only.

Logistic regression analysis (Table A.1.) of past-year energy drink users versus past-year non-energy drink users produced mixed results in comparison to the chi-square, bivariate analysis. In addition to being male, non-Black minority, younger (18–29 years old), and living in the city of Milwaukee, individuals in mid-life (30 to 54 years old) also were more likely to be energy drink users than non-energy drink users. The variables of education, employment, marital status, and children in the household were no longer significant. An additional logistic regression analysis (not reported here) found no significant interaction between race/ethnicity and place of residence, suggesting that non-Black minority energy drink use was elevated irrespective of urban residence.

Logistic regression analysis (Table B.1.) of past-year alcohol plus energy drink users and past-year energy drink users only also produced mixed results in comparison to the chi-square, bivariate analysis. In addition to young adult age (18–29 years old) and being single, Whites, individuals in mid-life (30 to 54 years old), and those with household incomes of \$60,000 or above were more likely to be alcohol plus energy drink users than energy drink users only. The variable of employment was no longer significant. An additional logistic regression analysis (not reported here) found no significant interaction between age and place of residence, suggesting that alcohol plus energy drink use was elevated among young adults and individuals in mid-life irrespective of urban residence.

Finally, chi-square analysis revealed significant overlap between past-year alcohol plus energy drink users and past-year hazardous drinkers, $\chi^2 (1, n=240) = 16.3, p<.001$. The cross-product ratio revealed that the odds of alcohol plus energy drink use among hazardous drinkers were almost 4 times higher (odds ratio=3.7; 95% CI 1.9–7.0) than the odds of alcohol plus energy drink use among nonhazardous drinkers.

4. Discussion

In this large community sample, close to one-third of respondents consumed at least one energy drink in their lifetime. This estimate is lower than what is reported in studies of college students (38 to 51%), (Malinauskas et al., 2007; Miller, 2008a, 2008b) most likely because teenagers and young adults are the primary energy drink consumers (Simon & Mosher, 2007).

Of the over one-fourth of respondents who consumed an energy drink in the past year, the logistic regression model suggests that energy drink use is more prevalent among males and especially young adults (18 to 29 years old). These findings are consistent with reported marketing practices that target young adults, and in particular, males through the sponsorship of male-dominated extreme sports (e.g., motocross) (Reissig et al., 2009; Simon & Mosher, 2007). Energy drink use also was more prevalent among individuals in mid-life (30 to 54 years old), which may suggest increased availability of energy drinks in settings frequented by this age group. Energy drink use was more prevalent among non-Black minorities, which is inconsistent with a study of college students that found Whites more likely to be energy drink users (Miller, 2008a). Future research is needed to confirm the more prevalent use of energy drinks by certain minority groups in broader communities. Finally, energy drink use was more prevalent among city of Milwaukee residents, which again may reflect increased availability and marketing of energy drinks in urban areas.

The prevalence of past-year alcohol plus energy drink use was 6% in this population-based sample, whereas in a recent college student study, approximately 16% reported past-month alcohol plus energy drink use (O'Brien et al., 2008). Even so, one in five of past-year energy drink users in our sample also used alcohol and energy drinks at the same time. In the logistic regression model, past-year alcohol plus energy drink use was more prevalent among Whites and young adults (18–29 years old). These findings are consistent, in part, with previous research that has found alcohol plus energy drink use more prevalent among White college students (O'Brien et al., 2008). Alcohol plus energy drink use also was more prevalent among individuals in mid-life (30 to 54 years old). Next to young adults, individuals in this age range have the next highest rates of alcohol use (SAMHSA, 2009). Thus, this finding may be the result of increased alcohol use and related exposure to the recent trend of consuming energy drinks on the same day or mixing directly with alcohol (Arria et al., in press). Alcohol plus energy drink use was more prevalent among single individuals and those with higher household incomes (\$60,000+). These findings may reflect that alcohol plus energy drink users tend to be younger, and may be consistent, in part, with

previous research on the positive relationship between higher income and alcohol consumption (Zarkin, French, Mroz, & Bray, 1998). Furthermore, and consistent with previous research (Arria et al., in press; Miller, 2008a; O'Brien et al., 2008), alcohol plus energy drink users also were more likely to be hazardous drinkers.

Strengths of this study include a representative, community-based sample. To our knowledge, this study is among the first that has expanded beyond college students and examined energy drink use in a broader population. Furthermore, this study was conducted in an area of the country characterized by a relatively high prevalence of alcohol-related problems (Berger, Fendrich, & Lippert, 2007). As previous college student studies have found frequent energy drink use and alcohol plus energy drink use associated with alcohol problems (Arria et al., in press; Miller, 2008a; O'Brien, et al., 2008), it is important to estimate the prevalence of energy drink use in high-risk communities. Future research is needed to further understand the relationship between energy drink use and alcohol problems and to devise interventions to reduce risk.

Limitations of this study include the use of landline telephone survey methodology, which does not take into consideration households that rely solely on cell phones. Weighting of survey data addresses (but not completely) this problem, especially for low-income and young adults (Blumberg & Luke, 2007). Small sample sizes for some subgroups in the analyses, for example, non-Black minority past-year energy drink users ($n=40$) need to be considered when interpreting the study findings. An additional limitation also may have been respondent knowledge of what is an energy drink. Amidst a confusing array of marketing messages for beverages derived from herbs and natural sources, which may or may not contain caffeine, some respondents may have incorrectly reported energy drink use. Finally, the cross-sectional design of this study does not allow a causal relationship to be drawn about whether or not alcohol plus energy drink use contributes to hazardous drinking or vice versa.

5. Conclusions

In conclusion, our study suggests a bifurcated pattern of energy drink use. We found more prevalent use of energy drinks among non-Black minorities. Specifically, American Indian or Alaska Native, Asian or Pacific Islander, Hispanic, and individuals of other racial/ethnic backgrounds had more prevalent use of energy drinks. Yet, when alcohol plus energy drink use is considered, a different racial/ethnic picture emerges. We found more prevalent alcohol plus energy drink use among Whites and younger individuals. Subsequent community research should provide more insight into the patterns and additional correlates of energy drink and alcohol plus energy drink use, especially regarding the reason(s) for non-Black minority attraction to products that provide an energy boost. In addition, we also found alcohol plus energy drink users more likely to be hazardous drinkers – a finding that may have important potential regulatory implications. That is, alcohol plus energy drink use may exacerbate the potential harmful consequences of drinking. Based on our community sample, our findings suggest the need for differential information messages depending upon subgroup being targeted. Future studies are needed to confirm these findings.

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Table A.1Logistic Regression Analysis: Past-Year Energy Drink Users vs. Past-Year Non- Energy Drink Users ($n=770$)

	Energy Drink Users (vs. Non-Energy Drink Users ^a)
	OR (95% CI)
Gender	
Male	3.74 (2.15, 6.51)***
Female	Ref ^b
Race/Ethnicity	
Black	1.11 (0.53, 2.33)
Other ^c	2.26 (1.02, 5.00)*
White	Ref
Age	
18–29	8.83 (3.46, 22.55)***
30–54	3.55 (1.70, 7.40)**
55+	Ref
Education	
Less than High School	0.46 (0.12, 1.81)
High School	1.54 (0.74, 3.20)
Some College	1.45 (0.81, 2.61)
College Degree	Ref
Employment	
Not Employed	0.87 (0.47, 1.61)
Employed (full or part time)	Ref
Household Income	
≤\$29,999	0.44 (0.16, 1.20)
\$30,000–\$59,999	0.67 (0.34, 1.32)
\$60,000+	Ref
Marital Status	
Not Married	1.86 (0.96, 3.59)
Married	Ref
Children in Household	
No	0.79 (0.44, 1.42)
Yes	Ref
Place of Residence	
Milwaukee City	1.99 (1.14, 3.47)*
Surrounding Area ^d	Ref

^aIncludes lifetime energy drink users who did not consume energy drinks in the past year.^bReference category.^cAmerican Indian or Alaska Native, Asian or Pacific Islander, Hispanic, and Other Racial/Ethnic Background.^dIncludes suburban areas of Milwaukee County plus the counties of Ozaukee, Washington, and Waukesha.

*
 $p < .05$.

**
 $p = .001$.

 $p < .0001$.

Table B.1

Logistic Regression Analysis: Past-Year Alcohol Plus Energy Drink Users vs. Past-Year Energy Drink Users Only ($n=167$)

Alcohol Plus Energy Drink Users (vs. Energy Drink Users Only)	
	<i>OR (95% CI)</i>
Gender	
Male	1.51 (0.47, 4.89)
Female	Ref ^a
Race/Ethnicity	
Black	0.18 (0.04, 0.90)*
Other ^b	0.22 (0.04, 1.40)
White	Ref
Age	
18–29	6.16 (1.04, 36.71)*
30–54	6.73 (1.20, 37.77)*
55+	Ref
Education	
Less than High School	0.51 (0.03, 8.43)
High School	1.20 (0.36, 3.95)
Some College	0.56 (0.12, 2.69)
College Degree	Ref
Employment	
Not Employed	1.40 (0.36, 5.45)
Employed (full or part time)	Ref
Household Income	
≤\$29,999	0.16 (0.03, 0.91)*
\$30,000–\$59,999	1.40 (0.36, 5.52)
\$60,000+	Ref
Marital Status	
Not Married	4.67 (1.02, 21.40)*
Married	Ref
Children in Household	
No	0.48 (0.15, 1.51)
Yes	Ref
Place of Residence	
Milwaukee City	2.44 (0.68, 8.68)
Surrounding Area ^c	Ref

^aReference category.

^bAmerican Indian or Alaska Native, Asian or Pacific Islander, Hispanic, and Other Racial/Ethnic Background.

^cIncludes suburban areas of Milwaukee County plus the counties of Ozaukee, Washington, and Waukesha.

*
 $p < .05$.