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The use of caffeinated alcoholic beverages among underage drinkers: Results of a national survey

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HIGHLIGHTS

- We surveyed a nationally representative sample of 1031 underage drinkers.
- We measured caffeinated alcoholic beverage (CAB) use in the past 30 days.
- The overall prevalence of CAB use was 52.4%; 48.4% among 13–15 year-olds.
- The prevalence of non-traditional CAB use was 19.6%; 17.1% among 13–15 year-olds.
- The use of CABs was associated with heavier drinking and adverse consequences.

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ABSTRACT

Objective: The mixing of alcoholic beverages with caffeine has been identified as a public health problem among college students; however, little is known about the consumption of such drinks among younger adolescents. We estimated the prevalence of caffeinated alcoholic beverage (CAB) use among a wide age range of underage drinkers, examined differences in traditional (i.e. self-mixed alcoholic beverages with soda, coffee and tea) and non-traditional CAB use (pre-mixed caffeinated alcoholic beverages or self-mixed alcoholic beverages with energy drinks or energy shots) among underage drinkers by age and other demographic characteristics, and examined differences in hazardous drinking behavior between CAB and non-CAB users.

Methods: We used an existing Internet panel maintained by Knowledge Networks, Inc. to assess the use of pre-mixed and self-mixed CABs in the past 30 days among a national sample of 1031 youth drinkers age 13–20. We conducted logistic regression analyses to estimate the relationship between traditional and non-traditional CAB use and risky drinking behavior as well as adverse outcomes of drinking, while controlling for age, gender, race/ethnicity, income, and general risk-taking (seat belt use).

Results: The overall prevalence of CAB use in the sample of underage drinkers was 52.4% (95% confidence interval [CI], 47.4%–57.4%). CAB prevalence was 48.4% among 13–15 year-old drinkers, 45.3% among 16–18 year-old drinkers, and 58.4% among 19–20 year-old drinkers. After controlling for other variables, we found a continuum of risk with non-traditional CAB use most significantly associated with binge drinking (odds ratio [OR] = 6.3), fighting (OR = 4.4), and alcohol-related injuries (OR = 5.6).

Conclusions: The problem of caffeinated alcoholic beverage use is not restricted to college-aged youth. The prevalence of CAB use among underage drinkers is higher than previously thought and begins in early adolescence. Adolescents who consume CABs, and particularly non-traditional CABs, are at increased risk of adverse outcomes.

1. Introduction

Underage drinking is a widespread public health problem that can lead to binge drinking, alcohol dependence, and other comorbidities in teenagers (Arria et al., 2011; Marczinski, 2011). Research has speculated that heavy episodic binge drinking is highly correlated with neurocognitive deficits, and contributes to preventable morbidity and mortality in college-aged students (Courtney & Polich, 2009) Alcohol causes 4700 deaths per year among persons under 21 (CDC ARDI), and alcohol use among high school students has been associated with a range of health risk behaviors such as current sexual activity, being a victim of dating violence, attempting suicide, and using illicit drugs, with risk increasing with frequency of heavy episodic binge drinking (Miller, Naimi, Brewer, & Jones, 2007). An emerging problem

Abbreviations: CAB, caffeinated alcoholic beverage.

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in underage drinking is the consumption of caffeinated alcoholic beverages including the combination of energy drinks with alcohol (Berger, Fendrich, Chen, Arria, & Cisler, 2011; Miller et al., 2007; O'Brien, McCoy, Rodes, Wagone, & Wolfson, 2008). The mixture of energy drinks and alcohol is particularly concerning because of evidence that youth who consume these drinks are at an increased risk of adverse outcomes (O'Brien et al., 2008; Thombs et al., 2010).

1.1. Energy drinks and alcohol

Energy drinks are beverages that claim to contain energy-providing ingredients by using a combination of caffeine, plant-based stimulants, simple sugars, glucuronolactone, amino acids, herbs and vitamins (O'Brien et al., 2008). The caffeine content in energy drinks is not regulated by the US Food and Drug Administration (FDA), in effect permitting the caffeine contents of some beverages to be 150%–300% greater than the amount of caffeine the FDA allows for cola beverages (Marczinski, 2011). The growing popularity of energy drinks has coincided with an increase in the prevalence among young people of mixing of these energy beverages with alcoholic drinks. A 2006 survey of college students found that 24% of them reported mixing energy drinks with their alcohol intake during the past month (Howland et al., 2010).

Research has demonstrated several adverse outcomes that may be associated with the use of caffeinated alcoholic beverages, especially among adolescents. Ferreira et al. noted that caffeinated alcoholic beverage consumption may decrease subjective feelings of being intoxicated (Ferreira, de Mello, Pompeia, & de Souza-Formigoni, 2006). Individuals consuming these beverages may mistakenly believe that they are less intoxicated than they are and more capable of engaging in behaviors that require fine motor control such as driving a car (Brache & Stockwell, 2011). A 2011 study by Marczinski et al. found that while caffeinated alcoholic beverage consumption did not alter impairment when compared to alcohol alone, it did reduce subjective feelings of mental fatigue and increase feelings of stimulation. In addition to CABs being associated with higher risk-taking behaviors, research has found the weekly or daily use of these beverages to be associated with alcohol dependence (Arria et al., 2011). The use of CABs may enable adolescents to drink more than they usually would by masking the feeling of intoxication.

1.2. The use of non-energy drink caffeinated alcohol among young people

Thombs et al. (2011) recently questioned the exclusive focus on alcohol mixed with energy drinks, pointing out that several studies have documented the popularity of more "traditional" combinations of alcohol and caffeine, such as mixing alcohol with caffeinated soft drinks like cola (Rossheim & Thombs, 2011; Thombs et al., 2011). These non-energy drink combinations of alcohol with caffeinated beverages, which we will term "traditional CABs", are concerning for three reasons. First, there is evidence that consumption of cola-caffeinated alcoholic drinks leads to equivalent levels of intoxication among young people as the consumption of alcohol mixed with energy drinks (Thombs et al., 2011). Second, there is evidence that for at least on-premise use, these traditional CABs may be more popular than alcohol mixed with energy drinks (Rossheim & Thombs, 2011). Third, while alcohol mixed with energy drinks has received much attention, the potential self-mixing of traditional caffeinated beverages such as soda and iced tea with alcohol may have fallen off the public health radar screen. Thombs et al.'s (2011, p.32) note, for example, that "previous research has failed to measure popular, non-energy drink, caffeinated mixers such as cola soda. This is problematic because if caffeine is responsible for facilitating heavy drinking, then consumption of alcoholic beverages mixed with cola soda should also be associated with higher levels of intoxication."

1.3. Existing literature on the use of CABs among underage youth

Recent research literature on caffeinated alcoholic beverages has focused mainly on the use of alcoholic energy drinks among the collegiate population (Arria et al., 2011; Berger et al., 2011; Brache & Stockwell, 2011; Ferreira et al., 2006; Howland & Rohsenow, 2012; Howland et al., 2010; Marczinski, 2011; O'Brien et al., 2008; Snipes & Benotsch, 2013). We are aware of four studies that have estimated the prevalence of the use of alcoholic energy drinks among college students (Brache & Stockwell, 2011; Marczinski, 2011; O'Brien et al., 2008; Snipes & Benotsch, 2013). However, we found no studies that have examined the use of alcoholic energy drinks among pre-college adolescents. Furthermore, we are aware of no studies that have examined the use of traditional CABs among either college or teenage youth, nor any studies that have compared the effects of traditional CAB use (alcohol mixed with soda, tea, or coffee) and non-traditional CAB use (alcohol mixed with energy drinks, energy shots, or energy pills). These gaps in research are important because: (1) the pre-college demographic is a particularly vulnerable population; (2) the previous estimates of CAB use among college students have been based on samples at a single university; and (3) it is not known whether there are differences in risk associated with various types of caffeinated alcohol beverages.

1.4. Present study

In this study, we conducted an analysis of the use of CABs among underage youth ages 13–20 by using a survey of a nationally representative sample of underage youth drinkers. This study adds to the previous literature by: (1) estimating the prevalence of CAB use among pre-college adolescents; (2) estimating the prevalence of CAB use among older adolescents using a national sample; (3) estimating the prevalence of traditional and non-traditional CAB use among pre-college and older adolescents; and (4) comparing the adverse outcomes of traditional and non-traditional CAB use among pre-college and older adolescent drinkers.

2. Methods

The youth alcohol brand study has been reported in detail elsewhere (Siegel, et al., 2013). In summary, an Internet panel maintained by Knowledge Networks, Inc. was used to obtain a nationally representative sample of 1031 youth ages 13–20 who had consumed at least one drink of alcohol in the past 30 days (Siegel et al., 2013). An online survey administered to these youth assessed which brands of alcohol they had used in the past 30 days, the number of days they consumed each brand, and the typical number of drinks of that specific brand that they consumed on those days.

The 18–20 year old respondents received an email invitation asking for their participation while individuals aged 13–17 were identified by asking adult panelists to report if they had children in that age group. Respondents who agreed to participate in the study were emailed a link to a secure survey website. This protocol was approved by the Institutional Review Board of the Boston University Medical Center. The overall response rate for youth aged 18–20 was 43.4%, and the overall response rate for youth aged 13–17 was 44.4%.

Validation studies have demonstrated that behavioral data obtained from the Knowledge Networks panel compare closely with estimates derived from more traditional survey techniques, such as national household, telephone, or in-person surveys (Siegel et al., 2013). We have previously shown that estimates of current drinking obtained through a survey conducted by Knowledge Networks were similar to those from the National Epidemiologic Survey on Alcohol and Related Conditions, or NESARC (Heeren et al., 2008). Thus, the Knowledge Networks panel is a less expensive, viable alternative to telephone and in-person surveys for assessing drinking behavior.