



Energy Drink and Alcohol mixed Energy Drink use among high school adolescents: Association with risk taking behavior, social characteristics



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ABSTRACT

Purpose: The aims of the study were to: a) examine the prevalence of energy drink (ED) and alcohol mixed with energy drink (AmED) consumption; b) investigate the relationships between ED and AmED with alcohol, binge drinking and drugs accounting for at risk behaviors among a representative sample of Italian adolescents.

Methods: A representative sample of 30,588 Italian high school students, aged 15–19 years, was studied. Binary and multivariate logistic regression analyses were performed to determine the independent association of the potential predictors' characteristics with the ED and AmED drinking during the last year.

Results: Respectively 41.4% and 23.2% of respondents reported drinking EDs and AmEDs in the last year. Multivariate analysis revealed that consumption of EDs and AmEDs during the last year were significantly associated with daily smoking, binge drinking, use of cannabis and other psychotropic drugs. Among life habits and risky behaviors the following were positively associated: going out with friends for fun, participating in sports, experiencing physical fights/accidents or injury, engaging in sexual intercourse without protection and being involved in accidents while driving.

Conclusions: This study demonstrates the popularity of ED and AmED consumption among the Italian school population aged 15–19 years old: 4 out of 10 students consumed EDs in the last year and 2 out of 10 AmED. Multivariate analysis highlighted the association with illicit drug consumption and harming behaviors, confirming that consumption of EDs and AmEDs is a compelling issue especially during adolescence, as it can affect health as well as risk taking behaviors.

1. Introduction

Energy drinks (EDs) are a group of beverages used to provide an extra burst of energy, promote wakefulness, increase attention span, maintain alertness, and improve athletic performance. The main active ingredients of EDs include varying amounts of caffeine, glucose, B-vitamins, herbs and stimulants such as ephedrine, taurine, ginseng, guarana, green tea, creatine, carnitine and yerba mate (Higgins, Tuttle, & Higgins, 2010). Caffeine content ranges from a modest 50 mg to an alarming one of 505 mg per can or bottle (Reissig, Strain, & Griffiths, 2009).

Since the introduction of the first ED brand in Austria in 1987, the energy drink market has grown exponentially and their consumption has become increasingly popular among teenagers and young adults, especially students and athletes over the past few years (Packaged Facts, 2013). In a survey of college students in the United States, 51%

reported consuming at least one energy drink in the preceding month. The majority of users consumed them to reduce sleep (67%), to increase energy (65%), and to drink with alcohol while partying (54%) (Malinauskas, Aebly, Overton, et al., 2007). Evidence from an European study conducted in 2012, which included 16 countries, found that 68% of adolescents had consumed energy drinks in the previous year, as compared with 30% of adults and 18% of children; consumption of ED and alcohol was observed in 53% of adolescent ED consumers and 56% of adult ED consumers (71% in “young adults”) (Nomisma-Areté Consortium, 2013). As regards Italian youths the results are limited to a small area: a 2012 survey in the Calabria Region, in the South of Italy, found that 68% of students, aged 15 to 19 years, reported ED use during their life, and about 55% reported consuming EDs during the 30 days before the survey (Flotta, Micò, Nobile, et al., 2014).

With the increasing popularity of EDs there has been a growing body of literature describing significant adverse health events after the

Abbreviations: ED, Energy Drink; AmED, alcohol mixed with energy drinks; ESPAD, European School Survey Project on Alcohol and Other Drugs; CAST, Cannabis Abuse Screening Test; SPIUT, Short Problematic Internet Use Test; CNR, National Research Council

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ingestion of these beverages: the most common adverse events affect the cardiovascular and neurological systems, due to excessive consumption of EDs, and in particular of caffeine, the most common ingredient in EDs (Ali, Rehman, Babayan, et al., 2015). Excessive caffeine consumption among youth can lead to both minor side effects such as irritability, nervousness, anxiety, dizziness, dehydration, gastrointestinal disturbances, insomnia and sleep disorders, as well as more serious side effects, such as, arrhythmia, tachycardia, seizures, hemorrhage, hallucinations and even death in rare cases (O'Brien, McCoy, Rhodes, et al., 2008).

There is a great public health alarm regarding the new way that young people consume alcohol mixed with energy drinks (AmEDs) (O'Brien et al., 2008; Thombs, O'Mara, Tsukamoto, et al., 2010), especially during socializing events such as "partying" longer. Energy drinks can mask the effects of alcohol so the drink number tends to be greater when combined with energy drinks (McKetin & Coen, 2014); drinking this combination can increase alertness and energy (Brache & Stockwell, 2011; Marczynski, Fillmore, Henges, et al., 2013). Recent research has found that mixing energy drinks with alcohol could be riskier than drinking alcohol alone, because the altered perception of drunkenness can favor longer drinking sessions (O'Brien et al., 2008; Peacock, Bruno, & Martin, 2012; Price, Hilchey, Darredeau, et al., 2010). Thus, the consumption of AmEDs has been associated with binge drinking (five or more drinks on one occasion) and a range of risk behaviors, like driving while intoxicated, being in a verbal and physical fight, requiring medical treatment, being hurt or injured, being taken advantage of sexually and using stimulant drugs (Brache & Stockwell, 2011). Some studies show a high prevalence of drinking AmEDs among college and secondary students, with rates above 50% (Flotta et al., 2014; Oteri, Salvo, Caputi, et al., 2007; Velazquez, Poulos, Latimer, et al., 2012). In particular, 46% of Calabrian adolescents had drunk AmEDs during their life, and 63% of lifetime users admitted drinking AmEDs during the 30 days before the survey (Flotta et al., 2014). 48% of participants in a survey of students at the faculty of Medicine in Sicily declares using AmEDs (Oteri et al., 2007).

To date, some studies among college students have been conducted about use of EDs/AmEDs and their association with other risk-taking behaviors, but there is a lack of information with respect to younger adolescents' use and habits. So, the aims of the present study were to examine the prevalence of EDs and AmEDs consumption and, to investigate the relationships between ED and AmED with alcohol, binge drinking and drugs accounting for at risk behaviors among a representative Italian sample of adolescents.

2. Materials and methods

2.1. Data

Data were drawn from the ESPAD®Italia 2015 (European School Survey Project on Alcohol and Other Drugs), a national school survey conducted annually to monitor risk behaviors among the Italian youth population by the Institute of Clinical Physiology of the Italian National Research Council (CNR) since 1995; the national survey is included in a larger cross national research project (ESPAD) aimed at collecting representative and comparable data on alcohol and drug consumption patterns in many European countries. Authorization of the selected school to participate in the ESPAD®Italia is required. The survey is included in the Scholastic Plan for Education (Decree of the President of the Italian Republic n.275/1999, Art. 8), edited and approved by Collegial Bodies, including teachers, parents and students (Legislative Decree n.297/1994). There was no need to present a scientific ethical statement in order to collect data. Parental permission for their children to participate was obtained prior to survey administration. Students were informed that participation was anonymous and voluntary. Utilizing the ESPAD methodology (Hibell, Guttormsson, Ahlström,

et al., 2012), self administered questionnaires were completed by a representative sample of high school students, aged 15–19 years.

The response rate of participating schools was 87.7%.

2.2. Measures

On the questionnaire, in addition to gender and age, the following questions were analyzed:

2.2.1. Dependent variables

(a) Energy drink use in the last 12 months

1. Use of EDs.
2. Use of AmEDs.

2.2.2. Independent variables

(b) Family/friend/school

1. Parental monitoring of Saturday night activities.
2. Student's feeling of being emotionally supported by parents and best friend.
3. Relational problems with parents and with friends.
4. Academic achievement.

(c) Substance use and wellness/health behaviors

1. Substance use: cigarette smoking, cannabis, stimulants, cocaine, hallucinogens, heroin, psychiatric drugs (tranquillizers/sedatives without a doctor's prescription) in the last year and heavy episodic drinking in the last month.
2. Behaviors against social rules or the law during the last year.
3. Leisure time activities.
4. Screening test: Cannabis Abuse Screening Test (CAST), Short Problematic Internet Use Test (SPIUT).

The variables are coded dichotomously (Table 1).

2.3. Statistical analysis

Prevalence of ED and AmED, students' social background, attitudes and drug use were summarized by using percentages. Binary logistic regression analysis, adjusted for gender and age, was conducted separately on each variable to assess relationships between ED and AmED drinking and the other adolescents' characteristics. Multivariate logistic regression analyses, included gender, age and all variables with a significance of 0.1, were also performed to determine the independent association of the potential predictor characteristics with the outcomes; the final model was selected by stepwise backward analysis. Results are reported as adjusted odds ratio (OR) with a 95% confidence interval. A p -value ≤ 0.05 was considered to be statistically significant. The statistical package SPSS 17.0 was used for the analysis.

3. Results

3.1. Descriptive results

With reference to the overall ESPAD®Italia2015 sample, a total of 30,588 participants aged 15 to 19 years completed the survey. Across the sample, 41.4% of respondents reported drinking EDs in the last year with a doubled percentage observed in males with respect to females (53.9% males; 28.7% females) and substantially increasing with age (Fig. 1). The age of first use for ED was < 13 years for about 35% of the sample (38.4% males; 30.1% females). With regard to the consumption of AmEDs, 23.2% of students had drunk them (29.3% males; 17.1% females) in the last year. For both beverages the highest prevalence was observed in 19 year old males.

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