American Journal of Food Science and Nutrition Research
2015; 2(2): 70-78
Published online March 20, 2015 (http://www.openscienceonline.com/journal/fsnr)

Energy Drinks Consumption in a Population of Youth and Young Adults in Argentina

Susana Carnevali*, María Claudia Degrossi

Department of General and Food Microbiology and Parasitology, Healthcare Sciences University Institute, HA Barceló Foundation, Buenos Aires, Argentina

Email address

ascarnevali@gmail.com (S. Carnevali)

To cite this article

Susana Carnevali, María Claudia Degrossi. Energy Drinks Consumption in a Population of Youth and Young Adults in Argentina. *American Journal of Food Science and Nutrition Research*. Vol. 2, No. 2, 2015, pp. 70-78.

Abstract

The aim of this study was to determine consumption habits for energy drinks in a population of youth and young adults, ages 18 to 40, in Argentina, in the period March to October 2013. The participants filled up a questionnaire of indirect management through the Web. 73.8% of the respondents consume ED at least once in the past year. Of these, 72.7% consume these drinks in the disco, 52.2% in bars, 55.3% when they go out at night, 49.7% when at a party with friends, 65.9% do so because they enjoy the taste, with a moderate consumption of once or twice a month (52.6%). 10.8% drank four or more cans in one single occasion, and 74.9% mixes energy drinks with alcohol. The high proportions of participants who mix these beverages with alcohol make it a priority to take educational actions aimed at the consumers, to reduce high-risk drinking and avoid situations that may compromise their health.

Keywords

Argentina, Energy Drinks, Preferences, Consumption, Young Adults, Health Risk

1. Introduction

Energy drinks (ED) are non-alcoholic drinks, usually carbonated, containing ingredients such as taurine, glucuronolactone, caffeine and inositol, accompanied by carbohydrates, plant extracts, vitamins and / or minerals and other authorized ingredients (preservatives, acidifiers, flavorings and colorings) [1,2].

These beverages were introduced to the market in Europe and Asia, as dietary supplements promoters of energy in the 1960s, and its use has expanded, becoming one of the most dynamic and fastest growing segments in the beverage industry, and it is estimated that by 2016 the world market will reach 6.5 billion liters [3, 4]. In the US, the energy drinks industry showed a steady annual growth from 2008 to 2013, and is expected to continue this upward trajectory to 2018 [5]. In Latin America increased consumption is observed, being the region with the highest rise [4, 6]. There are hundreds of different brands on the market with attractive packaging designs and colors that are readily available in supermarkets, bars and other businesses, without restrictions of any kind [7]. One of the marketing strategies is to offer it with attractive names, highlighting its benefits and stimulating properties [4, 8]. Regarding advertising of ED, some energy drink manufacturers promote it with images of fun, energy and of extreme sports, reflecting the market to which it is addressed, adolescents and young adults. Add to this, promotional activities and the presence of advertising posters in businesses, discos and bars which point to younger consumers [9, 10, 11, 12, 13].

Various reasons lead users to choose ED, such as improving concentration and alertness during exam time, enhance sports performance, or just for pleasure or fashion [3, 14].

As for its beneficial effects, several studies agree that consumption of these drinks provides increased physical endurance, maintenance of wakefulness, mood, improved reaction time, concentration, memory, cognitive performance, and drivability by reducing driver sleepiness during long periods of conduction. Such effects can be related primarily to the presence of caffeine or a synergistic interaction with other components, for example, taurine and glucuronolactone [2, 3, 15, 16, 17, 18].

While advertising and marketing of many of these drinks exalt its positive effects, they do not consider their adverse effects. These can be related, especially, to the excessive intake of caffeine, which can lead to psychosis or mania,

hyperactivity, aggression, lack of impulse control, cardiac arrhythmias, acute coronary syndrome and even sudden death [19, 20]. Adverse events can occur also in specific situations in which ED are consumed, such as in combination with alcohol or other abusive substances. In these cases, the combination of caffeine and alcohol consumption can alter the perception of alcohol intoxication and expose individuals to risk. There is a lack of information available on adverse events on over-consumption of energy drinks. Although some studies have examined the physiological effects of many active ingredients found in energy drinks (caffeine, taurine and glucuronolactone), alone or their potential synergistic effects, the acute and long-term effects are not well known [1, 11, 16, 17]. However the scientific literature reports cases of adverse effects and deaths associated with an excessive intake of these beverages [21, 22, 23, 24, 25, 26].

Due to concerns about excessive consumption of these drinks and lack of restrictions on sale, several countries and regions have developed guidelines to regulate the labeling, distribution, and sale of energy drinks that contain significant amounts of caffeine [27, 28, 29, 30, 31, 32]. In Argentina, the Argentine Food Code [33], regulates these beverages and establishes requirements for labeling, warning legends and guidelines for advertising.

Exposure scenarios for these drinks have changed in recent years, so it is necessary to collect current data on consumption, especially in adolescents and young adults, given their frequent association with alcohol and other substances [34]. Therefore the aim of this study was to determine the patterns of consumption of these drinks in Argentina in a population of youth and young adults of 18-40 years of age in order to update existing data on exposure to these drinks and set a key precedent for the characterization of risk to the health of this population.

2. Materials and Methods

2.1. Sample Selection Data Collection Instrument

In this study, descriptive and transversal, the data collection was conducted in the period from March to October 2013, through a questionnaire previously validated and approved by the Ethics Committee of the institution, based on previous experience [35] and similar questionnaires obtained by literature reviewed [36].

The instrument was answered voluntarily and anonymously by a population of youth and young adults of 18-40 years, regardless of nationality or type of study, residing in Argentina.

A non-probabilistic sample was chosen for convenience. The inclusion criteria were: youth and young adults, ages 18 to 40, of both genders, who, regardless of nationality or educational level voluntarily answer the questionnaire administered on the Web. Participants who did not fit these criteria were excluded.

The questionnaire, personal type and indirect administration via the Web through the application of Google Drive, was composed of three parts with 24 questions that asked the socio-demographic characteristics (age, gender, nationality, educational level, practical physical activity and frequency, lifestyle, weight and height), and the amount and brand of energy drinks consumed, frequency, times and reasons for consumption, alcohol consumption and type of alcoholic beverage with which the mixture was made.

2.2. Statistical Analysis

All data collected were examined with Excel for Windows and analyzed statistically using the Info-stat® statistical software for Windows (free version, Córdoba, Argentina).

Descriptive statistics included means, standard deviations, frequencies and percentages. Pearson's chi-square test was used to evaluate differences in frequencies or proportions between gender, age group, consumers and non-consumers of ED, considering a reliability interval of 95%.

Mann-Whitney's test, with a reliability interval of 95%, was used to determine whether medians between comparison groups were different.

3. Results

3.1. Sociodemographic Characteristics

973 people (589 women and 384 men), who met the inclusion criteria, responded the questionnaire. 718 (73.8%) consumed energy drinks at least once in the past year. Of all participants, 963 (99%) were from Argentine nationality, 473 (48.6%) lived in the hinterland and 495 (50.9%) in the Greater Buenos Aires (GBA), comprising the City of Buenos Aires and the districts of Greater Buenos Aires, constituting the largest urban area in the country.

The largest age group was between 21 to 30 years with 571 (58.7%) participants, followed by the 31-40 age group with 295 (30.3%) participants. The mean age (standard deviation) showed statistically significant differences (Mann-Whitney, $p < 0.0001$) among nonusers (29.8 (6.2), median 29) and consumers (26.6 (5.8); median 25) (data not shown).

Asked about their Educational attainment, 48.7% completed high school and 49.3% college, university or graduate studies.

As occupations, 47.2% of participants reported being employed, 36.7% were students, and 15.1% reported another occupation, among others, teachers, merchants, lawyers, doctors, dentists, nutritionists and kinesiologists. Table 1 presents the distribution of sociodemographic characteristics of study participants.

Consumers were asked about their family unit and personal habits such as daily sleeping hours and physical activity, factors that might be related to the consumption of energy drinks. Based on data collected, 61.8% sleep between, 7-8 hours, 26.8% six hours or less and, 11.4% nine hours or more. Regarding their family unit, 75.3% live with their family, parents, siblings, children or other family members and 21.3% alone. As for physical activity, 37.7% did not practice it and

44.5% did it regularly, between 1 and 2 times a week and every day. The results are shown in Table 2.

Table 1. *Sociodemographic characteristics of study participants (n=973)*

Characteristics	ED Consumers		
	Yes (n=718) N (%)	No (n=255) N (%)	Total (n=973) N (%)
Gender			
Female	412 (57.4)	177 (69.4)	589 (60.5)
Male	306 (42.6)	78 (30.6)	384 (39.5)
18-20	92 (12.8)	15 (5.9)	107 (11.0)
21-30	446 (62.1)	125 (49.0)	571 (58.7)
31-40	180 (25.1)	115 (45.1)	295 (30.3)
Nationality			
Argentina	709 (98.8)	254 (99.6)	963 (99.0)
Others	9 (1.2)	1 (0.4)	10 (1.0)
GBA	379 (52.8)	116 (45.5)	495 (50.9)
Hinterland	334 (46.5)	139 (54.5)	473 (48.6)
Unspecified	5 (0.7)	0 (0.0)	5 (0.5)
Primary school	9 (1.2)	3 (1.2)	12 (1.2)
High school	367 (51.1)	107 (41.9)	474 (48.7)
College/university*	337 (47)	142 (55.7)	479 (49.3)
Unspecified	5 (0.7)	3 (1.2)	8 (0.8)
Ocupation			
Student	280 (39.0)	77 (30.2)	357 (36.7)
Employee	347 (48.3)	112 (43.9)	459 (47.2)
Other occupation	84 (11.7)	63 (24.7)	147 (15.1)
Unspecified	7 (1.0)	3 (1.2)	10 (1.0)

*(including postgraduate degrees)

Table 2. *Family unit and personal habits of consumers (n=718)*

Characteristics	No.	Percentage
Family unit		
Living with parents and / or siblings, partner, children or grandparents	541	75.3
Alone	153	21.3
friends	4	0.6
Others	3	0.4
Unspecified	17	2.4
Physical activity		
Every day	34	4.7
3-5 times a week	136	19.0
1-2 times a week	149	20.8
Less than once time a week	128	17.8
Never	271	37.7
Daily sleeping hours		
≤6	192	26.8
7-8	444	61.8
≥9	82	11.4

3.2. Reasons and Consumption Occasions

Energy drink consumption patterns of energy drink users for occasions and reasons assessed are reported in Table 3. As for consumption occasions, the majority identified by users were in the disco (72.7%), in bars (52.2%), when out at night (55.3%), when making house parties with friends (49.7%). A statistically significant difference between men and women was found in the consumption of these drinks in the bar, where women prevailed over men (n = 375; p <0.0001; 62.4% vs. 37.6%). However men consume more than women while performing physical activities (n = 85; p <0.0001; 67.1% vs. 32.9%), at work (n = 60; p <0.001; 66.7% vs. 33.3%), during much working times (n = 115; p <0.001; 21.9% vs.11,6%), when driving long distances (n = 96; p <0.0001; 75% vs. 25%) and "when I have to drive and took alcohol" (n = 19; p <0.001; 84.2% vs. 15.8%).

Regarding the reasons for the consumption of these beverages, 65.9% of users noted that they do it because they like the taste, 40.7% because it helps to stay awake, 36.8% to recover when they are very tired, 32.1% because it gives energy. The men prevailed over women, when they consumed for improved physical performance (19.0% vs. 9.5%; p <0.01), because it gives them energy (37.9% vs. 27.7 %; p <0.05), because it helps them while driving car for long periods of time (24.5% vs. 6.3%; p <0.0001) and because it helps them take off the hangover (8.8% vs. 3.6%; p <0.05).

Table 3. *Distribution of occasions and reasons for the consumption of energy drinks (n = 718)*

Ocassions	No.	Percentage*
At home		
in any occasion	119	16.6
with friends during parties	357	49.7
In bars	375	52.2[a]
In disco	522	72.7
Doing physical activities	85	11.8[a]
At work	60	8.4[b]
During exam times	123	17.1
During much working times	115	16.0[b]
Driving car for long distances	96	13.4[a]
When I have to drive and took a lot of alcohol	19	2.6[b]
When I go out at night	397	55.3
Reasons		
To concentrate while studying or working	112	15.6
To improve physical performance	97	13.5[c]
Provides energy	230	32.1[d]
To be hydrated	72	10.1
To recover from tiredness	264	36.8
To be more sociable	55	7.6
For its taste	473	65.9
To stay awake	292	40.7
To help while driving car for long period of time	101	14.1[a]
Treat hangover	42	5.9[d]

*Given that some responders gave multiple answers, totals do not sum to 100.0. Values with same superscripts are considered significant (a <0,0001; b <0,001; c <0,01; d <0,05), when compared proportions of men and women (chi-square test with a confidence level of 95%).Values without superscripts are considered not significant (p>0.05).

3.3. Frequency and Amount Consumed Energy Drinks

The collected data on frequency and amount consumed of energy drinks by the users are shown in Table 4. 52.6% of consumers affirmed to have been drinking ED once or twice a month, while 19.9% consumed them sporadically, e.g. events, when they have to drive long distances or to stay awake to study. As regular consumer of these drinks, was found that 22.4% of users, between 1 time a week and every day. Weekly amount of cans consumed by users were, one or less (84.0%), two to three cans (9.2%) and four or more (1.6%).

The most common (97.2%) consumed size of ED resulted

to be 250 ml can. As brand, 71.3% indicated Speed Unlimited® followed for Red Bull® with 20.3%. These data are not shown in Table 4.

Table 4. *Energy-drink consumption of users of energy drinks (n = 718)*

Characteristics	No.	Percentage
Average frequency of monthly consumption		
Every day	3	0.4
4-5 times a week	8	1.1
2-3 times a week	30	4.2
Once time a week	120	16.7
1-2 times a month	378	52.6
Sporadically (≤1-2 times a month)	143	19.9
Unspecified	36	5.1
Amount of cans consumed weekly		
Less than one[a]	519	72.3
1	84	11.7
2	40	5.6
3	26	3.6
≥4[b]	12	1.6
Unspecified	37	5.2
Amount of cans consumed on a single occasion		
Only 1	312	43.4
2	219	30.5
3	90	12.5
4	63	8.8
≥5[c]	14	2.0
Unspecified	20	2.8
Frequency of consumption while physical activity is performed		
Always	10	1.4
Often/sometimes	60	8.4
Never	610	84.9
Unspecified	38	5.3

[(a)] Between 1 and 3 packs / month or less.
[(b)] Amount noted by consumers: 4, 5, 7, 20.
[(c)] > 5: 6, 8, 10, 12, 15 and 16 cans on a single occasion.

When inquiring about the amount of cans consumed on a single occasion in the past year, 43.4% informed they consume only one, two to three cans (43.0%) and 10.8% four or more. Data collected show values of individual consumption on a single occasion of up to sixteen cans.

Regarding the consumption of these beverages in association with performing physical activity, only 9.8% of users noted they drank ED on this occasion.

3.4. Energy Drink Consumption Associated to Alcoholic and Nonalcoholic Beverages

Asked about how the users drink these beverages, 23.6% stated that they drink energy drinks straight or mixed with juice, while 74.9% noted that they combine it with alcohol. Of these, 32.3% do it every time and 54.1% sometimes or often. Vodka and champagne were most frequently drinks used for mixing with energy drinks (68.6%), followed for other alcoholic beverages (29.0%), such as liqueur, beer, whiskey, Jägermeister, as shown for the consumer population in Table 5.

Figure 1 describes the main characteristics related to consumers that combine energy drinks with alcohol, by gender, age group and occupation. For these consumers, statistically significant differences were observed in the proportions of the age groups, women predominated over men in the 21-30 age group (60.2% vs. 39.8%, p <0.0001) and in the group 18-20 years (70.8% vs. 29.2%, p <0.001). Regarding the occupation, it is observed a higher proportion of female students (69.9% vs. 30.1%, p = <0.0001).

Similarly, women prevail over men in the combined use with alcohol, either often or sometimes (63.2% vs. 36.8%, p = <0.001 and 56.3% vs. 43.7%, p = <0.05 respectively).

Figure 2 describes the occasions, indicated for the consumers that combine energy drinks with alcohol, as the most frequent, considering participants to consume at these times, by gender. Women drink more assiduously than men, in bar (63.2% vs. 36.8%, p <0.0001), in parties with friends (58.9% vs. 41.1%, p <0.05), in the disco (58.8% vs. 41.2%, p <0.001), and for nights out (59.6% vs. 40.4%, p <0.001).

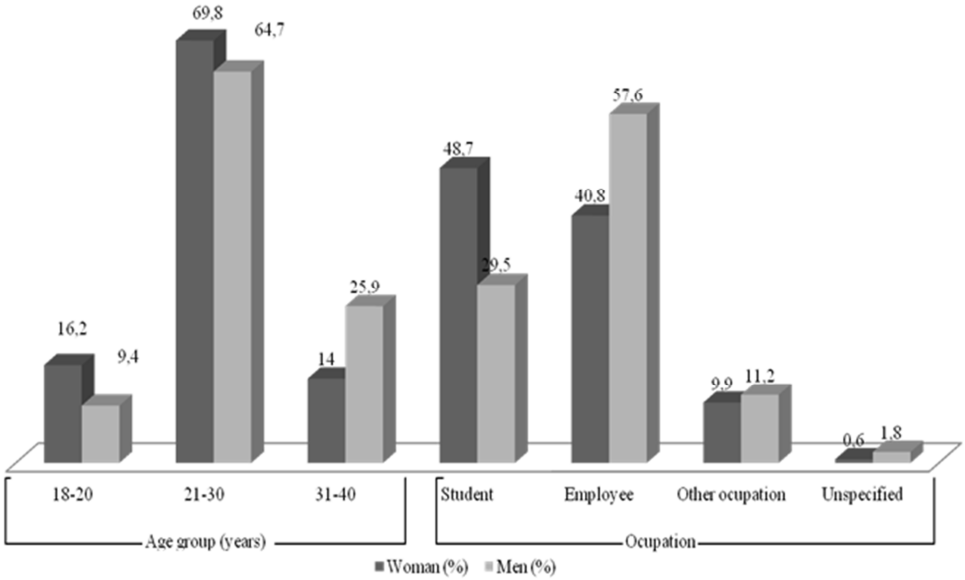

Fig 1. *Characteristics of consumers that mixing energy drinks with alcohol*

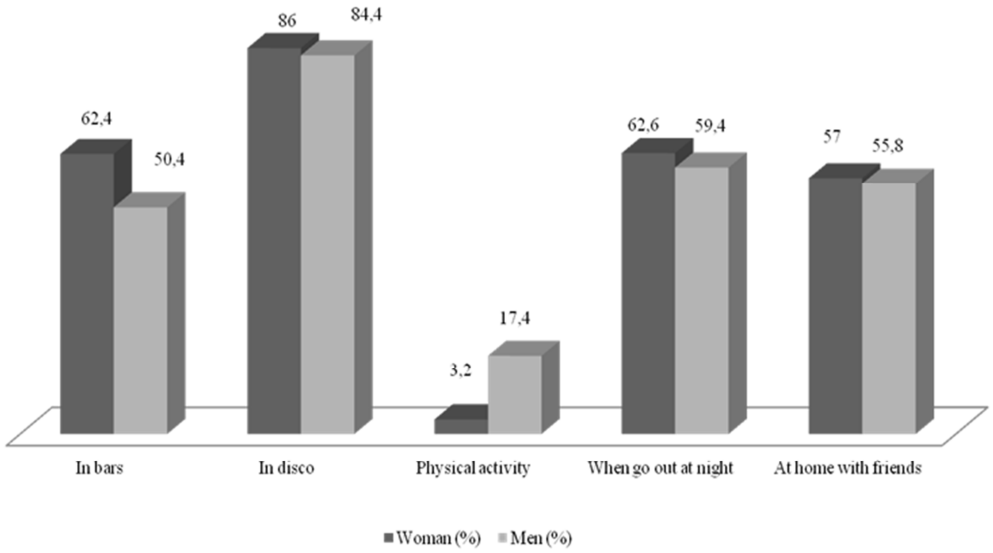

Fig 2. *Occasions for consuming energy drink with alcohol*

Table 5. *Energy-drink consumption characteristics with or without alcohol*

Characteristics	No.	Percentage
Mixed with other beverages (n=718)		
Straight	157	21.9
Mixed with juice	12	1.7
With alcohol	538	74.9
Unspecified	11	1.5
Type of alcoholic beverage mixed with the energy drink (n=538)		
Wine	14	2.6
Vodka/Champagne	369	68.6
Another alcoholic drinks or mixtures	84	15.6
Unspecified	71	13.2
Frequency of consumption with alcohol (n=538)		
Every time	174	32.3
Often/sometimes	291	54.1
Seldom	66	12.3
Unspecified	7	1.3
Amount of cans consumed on a single occasion		
Only 1	209	38.8
2	180	33.5
3	80	14.8
≥ 4	69	12.9

4. Discussion

Since energy drinks are consumed widely by youth and young adults, the prevalence of its use has been documented by several authors, among college students, athletes, persons concurrent to bars, among others, with estimates ranging from 38% to 81 % [15, 37, 38, 39, 40, 41, 42, 43, 44]. This coincides with the proportion of consumers found in our study, which is characterized mostly by users between 21-30 years, coinciding with findings in other studies in large segments of the population [36, 45]. It is also made up of more women, such as in other investigations [12, 37, 42, 46]. The prevalence observed in gender and age group, could be due to marketing and advertising strategies, that was targeted primarily towards young men and athletes, but now extends to other segments including women and adolescents and young adults, for which are attractive for their advertised effects. In our study, this could also be associated to places where women mostly consume, which are the bars, disco and nightlife, that how already mentioned, are the places where these drinks are promoted [1, 3, 9].

Rotstein et al. [26], mentions that energy drinks are frequently marketed to individuals interested in an active lifestyle. The advertisement of some brands is associated to sports events and athletes [32]; this can lead to many of them consuming these beverages before or after competition, such as the findings of Buxton & Hagan [44]. While ED intake before exercise can improve physical endurance, consumption after it, may result in a delay in normalizing heart rate [36, 45, 47]. Most consumers of this study do not consume energy drinks while practicing physical activity and only 10% do so regularly. These values are far from other research conducted in large segments of the population in Europe and the US [36, 45].

Situations where youth and young adults consume energy drinks have been well documented in other studies [36, 37, 43, 44, 46, 48]. The findings of these studies, in terms of population and geographical areas where they were made, may differ from those of this work, since they can vary the circumstances that lead young people to consumption. However, almost all these reasons, such as providing energy, to stay awake, to recover from tiredness and for its taste, and the places where young people usually attend, such as disco, bars, parties with friends and during nights out were mentioned for the consumers in our study, and coincide with research conducted in Argentina [15, 40].

It is in the previously indicated occasions where those consumers who mix energy drinks with alcohol, which constitute two thirds of the sample, do it most often. In the investigation of the Federal Institute for Risk Assessment - BfR [48], 39.5% of those participants were attending discos and clubs, 41% music festivals and 22.7% LAN (Local Area Network) parties, declared that combine ED with alcohol. Vodka has the highest prevalence with 75% to 85% according

to the occasion, followed by other beverages such as liquor, Jägermeister and whiskey. Moreover, the survey by the European Agency for Food Security [36] revealed that 56% of ED users mixed it with alcohol, being the age group 18-29 the most prevalent (71%). These findings are similar to our study.

In BfR research [48] those attending the events mentioned, said they do so primarily for taste and to stay awake longer. It is precisely the taste, one of the reasons most often identified in our study as motivation for consumption. This may be an important factor in deciding the purchase of energy drinks, but may also be related to the sweetness of the energy drink that masks the taste of alcohol, making it more acceptable, especially important factor in younger drinkers [10, 11, 14].

The consequences of mixing energy drinks with alcohol and the motivations that leads young people to this practice have been widely reported in the literature. Studies on college students in USA, revealed that they did "to drink more and not feel drunk, to hide the taste of alcohol, its effects and the feeling of drunkenness, to reduce sedation compared to alcohol only, and to get drunk faster" [10, 38, 41]. These perceptions of young people, lead to the question if the increased alcohol consumption is due to the intake of energy drinks, or occurs in people who have a tendency to engage in risky behavior and consume large amounts of psychoactive substances, including caffeine and alcohol. Weldy [49], reports that when consumed jointly ED and alcohol, caffeine mitigates the sedative effects of alcohol and prevents sleep, giving more opportunity to consume more alcohol before loss of consciousness. While little is known about the mechanisms underlying these risks, several studies report that alcohol increased in people taking risks by reducing motor skills, cognitive functioning, trial, ability in decision making, damaging thus the ability to accurately assess the consequences of their behaviors, such as, driving while intoxicated, disregarding the risks of accidents, injuries and sexually transmitted diseases and exposure to risk of consuming other drugs abusively. These responses depend on the person, their previous exposure and tolerance to alcohol and caffeine [9, 41, 49].

The health risks associated with energy drink consumption are related to their caffeine content. Although caffeine is consumed worldwide and for a long time ago, in the form of drinks, food, nutritional supplements and drugs, their consumption through energy drinks, concerns arise when these drinks are consumed in excessive amounts or in certain population groups for the possible induction of adverse effects on human health. One of the characteristics of risk assessments is precisely to identify these specific population groups that may be at increased risk of adverse effects related to chronic or acute intake of caffeine [29, 47].

Considering the frequency of consumption of this study, two third parts of consumers have done it 1-2 times a month and sporadically during social events, exam time and driving long distances. Literature reports higher frequencies, however, these studies were conducted on students who reported different motivations for using more often energy drinks, for example, to stay awake before an examination or to increase the hours of study during the academic life [15, 37, 46]. In the survey conducted in several European countries over a wider population and covering various age groups [36], energy drinks-users, consumed more frequently than in this study, however both studies approach in the percentage of those they do one time a week.

Considering the amount of cans consumed on one occasion, almost a quarter of consumers of this study drink three or more cans, reaching for some consumers extreme values of up to sixteen cans. This is consistent with findings from previous studies, although they differ among themselves and with this study in the percentage of consumers who reach these values, depending on whether the study was conducted in specific or broader populations with greater age range [27, 36, 37, 47, 48].

High consumption of ED implies a higher exposure to caffeine and other active substances, such as taurine, and glucuronolactone. This issue was identified, especially in children and young adults, as a potential emerging risk by the European Food Safety Authority (EFSA) [36]. Given the still inconclusive and conflictive data concerning many aspects of the ingredients of ED, for example the suspicions of renal failure for glucuronolactone and of undesirable neurobehavioural effects for taurine, their potential synergistic effects one another or with caffeine, further research is needed to better understand these issues, and to examine the long-term risks in chronic consumers and the acute effects derived from excessive consumption of these beverages [1, 3, 11, 16, 47].

Regarding caffeine intake, in the survey conducted by [36], average exposure to caffeine from ED was 374 mg/ single occasion, with maximum values of 800 mg/single occasion. In the study by ANSES [47], average intakes of caffeine estimated for ED consumers were 108 mg/ single occasion. As mentioned above, the excessive consumption of energy drinks may result in adverse effects and deaths caused from episodes of acute intakes, some also related to consumption with alcohol [22, 23, 24, 25].

While there are no specific recommendations for caffeine intake in healthy adult subjects, some suggest that a daily intake of 400 mg of caffeine [31] is not associated with any adverse health effects in healthy adults except pregnant women. Intakes above these values can lead to various disorders that depend on individual sensitivity. Some risk assessment agencies recommend a dose in adults of 210 mg / day based on observations of increased anxiety [27].

According to the estimation of ED high acute consumers (at least 1L / single occasion) by EFSA [36], and considering the most common consumed size (250 mL can) indicated for the users of our study, those who consume four or more cans/single occasion, could be exposed to the risk of caffeine adverse events.

5. Conclusion

Although in this study the sample of consumers is characterized by a low frequency of consumption, a tenth drink large amount of cans on a single occasion and most

consumers combine energy drinks with alcohol. This last habit is consistent with the motivations for consumption related to stimulant effects of these beverages, and consumption points specified by users, bars, clubs, nightlife and events with friends.

That is why to change habits and behaviours favourable to health sense, it is a priority to strengthen communication strategies about risk to the community, especially ordinary consumers of these drinks, and in areas where concur children, adolescents, young , pregnant women, in order to inform and raise awareness about the likely adverse effects resulting from excessive consumption and the risk of combining these drinks with alcohol, as part of a program to reduce high-risk drinking and its consequences thereof, to take appropriate precautions and avoid situations that may compromise your health.

Limitations

This study used cross-sectional data, which, although allowed to collect actual information and in shorter time, limits the ability to assess causal relationships.

Internet surveys are recognized as an efficient method for data collection and allowed, in our study, to include different geographical areas of our country and reach a large number of people, with a high response rate. However the distribution of the questionnaire on-line has the disadvantage that only participate in it those who have access to the Internet, either through personal computers and other mobile devices, limiting the number and quality of participants.

References

[1] Reissig, C. J., Strain, E. C., Griffiths, R. R. Caffeinated energy drinks—A growing problem. Drug and Alcohol Dependence 2009; 99(1–3): 1-10.

[2] Roussos A., Franchello A., Flax Marcó F., De Leo M., Larocca T., Barbeito S., Rochaix A., Jacobez S., Alculumbre R. Bebidas energizantes y su consumo en adolescentes. Pediatría y Nutrición 2009; 10 (2): 124-129.

[3] Heckman, M., Sherry, K., Mejia, D., Gonzalez, E. Energy drinks: An assessment of their market size, consumer demographics, ingredient profile, functionality, and regulations in the United States. Comprehensive Reviews in Food Science and Food Safety 2010; 9(3): 303-317.

[4] (2012) Zenith International. Global energy drinks market spurts ahead to $37 billion. Press release. [Online]. Available: http://www.zenithinternational.com/articles/1012?Global+energy+drinks+market+spurts+ahead+to+$37+billion

[5] (2014) Institute of Food Technologists (IFT). Energy drink market continues growth. Press release. [Online]. Available: http://www.ift.org/food-technology/daily-news/2014/january/09/energy-drink-market-continues-growth.aspx

[6] Soto, G. Consumo de bebidas energéticas en Chile. Boletín Observatorio Chileno de Drogas 2012; 14: 1-14.

[7] Jasák, H., Szente, V. Energy drinks on scale. The Hungarian Journal of Food Nutrition and Marketing 2012; 8 (1-2): 61-66.

[8] (2014) Research and Markets: Global Energy Drink Market 2014-2018: Increase in Use of Natural Ingredients in Energy Drinks a Major Trend. Press release. [Online]. Available: http://www.reuters.com/article/2014/02/19/research-and-markets-idUSnBw196628a+100+BSW20140219

[9] Arria, A. M., Caldeira, K. M., Kasperski, S. J., O'Grady, K. E., Vincent, K. B., Griffiths, R. R., Wish, E. D. Increased alcohol consumption, nonmedical prescription drug use, and illicit drug use are associated with energy drink consumption among college students. Journal of Addiction Medicine 2010; 4(2): 74.

[10] Jones, S. C., Barrie, L., Berry, N. Why (not) alcohol energy drinks? A qualitative study with Australian university students. Drug and Alcohol Review 2012; 31(3):281-7.

[11] Pennay, A., Lubman, D.I. Alcohol and energy drinks: a pilot study exploring patterns of consumption, social contexts, benefits and harms. BioMedCentral Research Notes 2012; 5:369.

[12] Jacob, S., Tambawel, J., Trooshi, F.M., Alkhoury. Y. Consumption pattern of nutritional health drinks and energy drinks among university students in Ajman, UAE. Gulf Medical Journal 2013; 2(1): 22-26.

[13] Nasir, K., Surriya, O., Imadi, S.R., Chaudhry, A.H., Mahmood, I., Munir, H. Effect of fizzy and energy drinks on public health: a cross-sectional study. Journal of Public Health and Biological Sciences 2013; 2 (3): 229-242.

[14] Bunting, H., Baggett, A., Grigor, J. Adolescent and young adult perceptions of caffeinated energy drinks. A qualitative approach. Appetite 2013; 65(0): 132-138.

[15] Ballistreri, M. C., & Corradi-Webster, C. M. Consumption of energy drinks among physical education students. Revista Latino-Americana De Enfermagem 2008; 16(SPE): 558-564.

[16] Van den Eynde, F., van Baelen, P.C., Portzky, M., Audenaert, K. The effects of energy drinks on cognitive performance. Tijdschr Psychiat 2008; 50(5):273-81.

[17] Alford, C., König, J., Aufricht, C., Verster, J.C. Proceedings of the 2010 Energy Drinks Symposium. The Open Neuropsychopharmacology Journal 2011; 4: 1-4.

[18] Mets, M.A., Ketzer, S., Blom, C., van Gerven, M.H., van Willigenburg, G.M., Olivier, B., Verster, J.C. Positive effects of Red Bull® Energy Drink on driving performance during prolonged driving. Psychopharmacology 2011; 214: 737–745.

[19] Bigard, A. Dangers des boissons énergisantes chez les jeunes. Archives De Pédiatrie 2010; 17(11): 1625-1631.

[20] Lloret, J. (2011). Intoxicación aguda por bebidas energizantes (a base de taurina, inositol y cafeína). En I. Morán Chorro, J. Baldirà Martínez de Irujo, L. Marruecos – Sant, y S. Nogué Xarau, S. Toxicología clínica (pp.535-541). Madrid, España: Grupo Difusión, Difusión Jurídica y Temas de Actualidad S.A.

[21] Gunja, N., Brown, J. A. Energy drinks: Health risks and toxicity. Med J Aust 2012; 196(1): 46-49.

[22] Iyadurai, S. J. P., Chung, S. S. New-onset seizures in adults: Possible association with consumption of popular energy drinks. Epilepsy & Behavior 2007; 10(3): 504-508.

[23] Rottlaender, D., Motloch, L. J., Reda, S., Larbig, R., Hoppe, U. C. Cardiac arrest due to long QT syndrome associated with excessive consumption of energy drinks. International Journal of Cardiology 2012; 158(3): e51-e52.

[24] Schöffl, I., Kothmann, J.F., Schöffl, V., Rupprecht, H.D., Rupprecht, T. "Vodka Energy": Too Much for the Adolescent Nephron?. Pediatrics 2011; 128 (1): e227- e231.

[25] Avcı, S., Sarıkaya, R., Büyükcam, F. Death of a young man after overuse of energy drink. The American Journal of Emergency Medicine 2013; 31(11): 1624.e3-1624.e4.

[26] Rotstein, J., Barber, J., Strowbridge, C., Hayward, S., Huang, R., Godefroy, S. B. Energy Drinks: An Assessment of the Potential Health Risks in the Canadian Context. International Food Risk Analysis Journal 2013; 3, (5): 1-37.

[27] Thomson, B., Schiess, S. Risk Profile: Caffeine in Energy Drinks and Energy Shots. Institute of Environmental Science & Research Limited, New Zealand Food Safety Authority, Project CFS/09/04 2011.

[28] (2011). Regulation (EU) No. 1169/2011 of the European Parliament and of the Council of 25 October 2011 concerning consumer information on foodstuffs. Official Journal of the European Union, L 304/18-63. [Online]. Available: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R1169&from=EN

[29] (2009). Norwegian Scientific Committee for Food Safety. Opinion of the Panel on Food Additives, Flavourings, Processing Aids, Materials in Contact with Food and Cosmetics of the Norwegian Scientific Committee for Food Safety. New information on ingredients in so-called "energy drinks". 09-404-4 final. [Online]. Available: http://www.vkm.no/dav/a8859a2195.pdf

[30] (2012). Health Canada, Government of Canada. Category Specific Guidance for Temporary Marketing Authorization - Caffeinated Energy Drinks. [Online]. Available: http://www.hc-sc.gc.ca/fn-an/legislation/guide-ld/guidance-caf-drink-boiss-tma-amt-eng.php#a68

[31] (2013). Health Canada, Government of Canada. Health Canada Reminds Canadians to Manage Their Caffeine Consumption. Identification number: RA-34021. [Online]. Available: http://healthycanadians.gc.ca/recall-alert-rappel-avis/hc-sc/2013/34021a-eng.php

[32] Breda, J.J., Whiting, S.H., Encarnação, R., Norberg, S., Jones, R., Reinap, M., Jewell, J. Energy drink consumption in Europe: a review of the risks, adverse health effects, and policy options to respond. Front. Public Health 2014; 2:134.

[33] Administración Nacional de Medicamentos, Alimentos y Tecnología Médica (ANMAT). Código Alimentario Argentino, Capítulo XVII. [Online]. Available: http://www.anmat.gov.ar/alimentos/codigoa/ CAPITULO_XVII.pdf.

[34] European Food Safety Authority (EFSA). Scientific Opinion of the Panel on Food Additives and Nutrient Sources added to Food on a request from the Commission on the use of taurine and D-glucurono-γ-lactone as constituents of the so called "energy" drinks. The EFSA Journal 2099; 935: 1-31.

[35] Degrossi, M.C, Etcheverry, M., Florez, S. Consumo de bebidas energizantes y alcohol: encuesta a jóvenes de entre 18 y 35 años. En XVIII Congreso Argentino de Nutrición. Buenos Aires, Argentina 2011.

[36] (2013). Zucconi, S., Volpato, C., Adinolfi, F., Gandini, E., Gentile, E., Loi, A., Fioriti L. Gathering consumption data on specific consumer groups of energy drinks. Supporting Publications 2013:EN-394, [190 pp.]. [Online]. Available: http://www.efsa.europa.eu/en/supporting/pub/394e.htm

[37] Malinauskas, B. M., Aeby, V. G., Overton, R. F., Carpenter-Aeby, T., Barber-Heidal, K. A survey of energy drink consumption patterns among college students. Nutr J 2007: 6(1): 35-41.

[38] Marczinski, C. A. Alcohol mixed with energy drinks: Consumption patterns and motivations for use in US college students. International Journal of Environmental Research and Public Health 2011; 8(8): 3232-3245.

[39] Miller, K. E. Energy drinks, race, and problem behaviors among college students. Journal of Adolescent Health 2008; 43(5): 490-497.

[40] Moyano, N, Raimondo, E, Gattás, I, Gallar, S. (2010). Consumo de Cafeína a Través de Bebidas Energizantes en Personas de 18 a 30 Años de Edad de la Ciudad de Mendoza. En II Jornadas de Investigación 2010 - Universidad Juan Agustín Maza (p.17). Mendoza, Argentina: Universidad Juan Agustín Maza.

[41] O'Brien, M. C., McCoy, T. P., Rhodes, S. D., Wagoner, A., & Wolfson, M. (2008). Caffeinated cocktails: Energy drink consumption, High-risk drinking, and Alcohol-related consequences among college students. Academic Emergency Medicine 2008; 15(5): 453-460.

[42] Snipes, D. J., & Benotsch, E. G. High-risk cocktails and high-risk sex: Examining the relation between alcohol mixed with energy drink consumption, sexual behavior, and drug use in college students. Addictive Behaviors 2013; 38(1): 1418-1423.

[43] Attila, S., & Çakir, B. Energy-drink consumption in college students and associated factors. Nutrition 2011; 27(3): 316-322.

[44] Buxton, C., & Hagan, J.E. A survey of energy drinks consumption practices among student -athletes in Ghana: lessons for developing health education intervention programmes Journal of the International Society of Sports Nutrition 2012; 9(9): 1-8.

[45] Park, S., Onufrak, S., Blanck, H. M., & Sherry, B. Characteristics associated with consumption of sports and energy drinks among US adults: National health interview survey, 2010. Journal of the Academy of Nutrition and Dietetics 2013; 113(1): 112-119.

[46] Ramón-Salvador, D.M., Cámara-Flores, J.M., Cabral-León, F.J., Juárez-Rojop, I.E., Díaz-Zagoya, J.C. Consumo de bebidas energéticas en una población de estudiantes universitarios del estado de Tabasco, México. Salud en Tabasco 2013; 19 (1): 10-14.

[47] (2013). French Agency for Food, Environmental and Occupational Health & Safety (ANSES). Opinion of the French Agency for Food, Environmental and Occupational Health & Safety on the assessment of risks concerning the consumption of so-called "energy drinks". ANSES Opinion Request no. 2012-SA-0212, 1-108. [Online]. Available: http://www.anses.fr/en/documents/NUT2012sa0212EN.pdf

[48] (2013). Bundesinstitut für Risikobewertung (BfR). Anlassbezogene Befragung von Hochverzehrern von Energy-Drinks. [Online]. Available: http://www.bfr.bund.de/cm/350/anlassbezogene-befragung-von-hochverzehrern-von-energy-drinks.pdf

[49] Weldy, D. L. Risks of alcoholic energy drinks for youth. The Journal of the American Board of Family Medicine 2010; 23(4): 555-558.