

Statistical survey focused on diffusion and knowledge of energy drinks, conducted in Palermo

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Abstract

In recent years energy drinks consumption has increased, due to their ability to improve physical and cognitive performance. Unfortunately, because of poor or incorrect information, people are not always aware of the harmful consequences of these drinks such as obesity, diabetes, hypertension, tachycardia until death. Therefore, we conducted a statistical survey in the Palermo area, submitting a paper questionnaire to 1003 people. Data analysis

shows that only 29% of the audience never consumed energy drinks, while 71% tried them at least once in their life, especially in adolescence; 81% never or rarely drink them, 14% drink them a few times a month, while 5% drink them several times a week. Energy drinks are mostly consumed in disco, sport and study contexts; 93% of respondents are aware of the risks caused by the excessive consumption of them; 91% know that it is not appropriate to associate them with alcohol, but 9% think it is better to mix them; 72% of interviewees know that people should never drink energy drink with alcohol, 13% do it only in the weekend, while 15% think it is appropriate to do whenever they want. In fact, 14% do not believe it is risky to take energy drinks together with alcohol, and 40% do not know whether it is risky or not, while 46% know it can be risky; 45% associate the idea of cigarettes with alcohol and energy drinks. In conclusion, it is appropriate to highlight their risks to prevent some fatal consequences.

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Introduction

The term Energy Drinks (ED) refers to all drinks, mostly non-alcoholic and with a sweetish taste, containing stimulating substances, intended to provide energy to the consumer with the aim of increasing their physical and cognitive performance. Consumption among the youngest is growing more and more every year: the numbers of the Authority European Food Safety say that 68% of teenagers between 10 and 18 years old drink them regularly and 16% of children between 6 and 10 years old drink them, with an average of almost 4 liters a month.¹ In these age groups, the ED market is largely facilitated by the existence of multiple online shops that allow to purchase these drinks in a simple, cheap and sometimes even illegal way. In fact, given the new regulations that control or limit the sale in an increasing number of countries, online purchasing is becoming increasingly popular, allowing to become owners of products normally banned from free trade. The ingredients present in almost all Energy Drinks are: i) Stimulating substances (mainly caffeine in high doses) of plant origin contained in guarana, ginseng and *Ginkgo biloba*; ii) Amino acids such as taurine (with cardio tonic effect) and carnitine (which helps to reduce the sense of fatigue); iii) Sugars, of which the main one is glucuronolactone (used as a detoxifier); iv) B vitamins that regulate cellular catabolism mechanisms.

Caffeine is mainly consumed by virtue of its psychostimulant properties and is undoubtedly the most consumed psychoactive substance by the entire world population. However, especially at high doses, it is not without side effects, such as increased alertness, increased mental and conversational skills, decreased fatigue

and reduced sleep.² The intake of caffeine at very high doses has also been associated with the possible occurrence of convulsions: in fact, there have been cases of convulsions, both in patients with known epilepsy³ and in patients without any previous history of epilepsy,⁴ associated precisely with the high caffeine content in ED. It is estimated that a normal ED contains an amount of caffeine varying between about 50 mg and about 500 mg, well 150%-300% more than that of a common Cola.⁵ In association with caffeine, guarana (containing high doses of caffeine), ginseng and *Gingko biloba* are often found in ED. The first has stimulating effects, so much so that the side effects deriving from its excessive consumption include the increase in heart rate, blood pressure, and other events related to the excessive vasoconstrictive effect of caffeine.⁶ Ginseng, on the other hand, is known for its tonic and adaptogenic properties and is believed to improve athletic performance, stimulate memory, the immune system and improve mood.⁷ *Gingko biloba*, in addition to the antioxidant properties due to the synergistic action of flavonoids and terpenoids of which it is constituted, favors the vascular circulation, improving cerebral blood flow, which enhances the results of cognitive activities.⁶

Along with these substances, taurine is also a key component of ED, as it improves the ability to perform physical exercise, increasing the resistance to fatigue and enhancing sports results.⁸ It has often been erroneously claimed that taurine was an energy stimulant, but in reality it has the opposite action, being involved in inhibiting the excitatory neurons of the brain, which makes it more of a relaxing substance.⁹ However, antioxidant properties have been demonstrated:¹⁰ in particular, it has the effect of counteracting the oxidizing substances released by the body following physical exercise.¹¹ Its use as an ingredient in ED is therefore optimal alongside caffeine, for its benefits in reducing fatigue, promoting thermoregulation and improving concentration. Excessive consumption of ED is not considered to be without risks for the human health. Classically, the possible adverse effects of this habit were associated with the particularly high content of caffeine: in particular in adolescents the use of stimulating agents can lead to states of nervousness, which can degenerate into real anxiety attacks, with consequent increase in heartbeat, gastric acidity and intestinal irritability. In fact, the data suggest that age is an important factor in the toxicity of caffeine: although the aged or sick brain may benefit from caffeine supplementation, it seems that adolescents do not benefit and may, in fact, suffer adverse effects from chronic ingestion of high doses.⁹

Finally, for adolescents, there is another very serious risk linked to the consumption of ED: the association of these with super-alcoholic drinks. This practice, now increasingly widespread, is constantly increasing and represents a significant public health problem. The potential risks associated with the combined consumption of ED and alcohol are: i) The stimulating effect of caffeine is able to mask the depressive effect of alcohol, leading the consumer to underestimate their state of alcoholic intoxication;⁸ this can induce the consumer to further increase alcohol intake, whose depressive effects on the central nervous system will be perceived only once the stimulating effect of the caffeine has diminished. At this point, however, the symptoms of alcoholic intoxication may already be relevant and characterized in the most serious cases, by respiratory depression; ii) The combined consumption of ED and alcohol is associated with a greater use of alcohol itself, and therefore a habitual consumption of energy drinks is connected to a greater risk of alcohol dependence; iii) Alcohol and energy drinks have diuretic effects;⁸ therefore their consumption in combination would increase the risk of dehydration, taking into account the increase in diuresis and sweating,

which causes an alteration of the correct hydroelectrolytic balance;¹⁰ iv) Tachycardia and palpitations are among the most common side effects related to the association of alcohol and ED; moreover, this association can determine the onset of arrhythmias in subjects with underlying heart diseases.¹¹

However, it should be remembered that, if consumed in minimal doses, ED (and their main ingredients) can bring benefits to the body, even if the positive effects of the various stimulating substances, vitamins and sugars, are in a clear minority, compared to those unwanted on the cardiovascular and nervous system.

The aim of this work is to describe the spread of erroneous behaviors related to the use of ED among a representative sample of the population: in fact, if there are many wrong behaviors, it would be advisable to undertake multiple information and prevention projects suitable to stem these phenomena.

Materials and Methods

This work is included in the project "Prevention and Information about New and Rape Drugs, Addiction and Amateur Doping" sponsored by the University of Palermo and the Health Department of the Sicilian Region.

We conducted this research in order to evaluate, in a randomized sample of the population, how widespread some erroneous behaviours related to use and abuse of ED are.

We have done a statistical analysis about some data obtained through the administration of a questionnaire on paper, composed by 17 items, during the period from March 2018 to March 2019.

We created this questionnaire, called "Use and Consumption of Energy Drinks." The analysed sample is representative as it involves 1003 people (613 women and 390 men) from the Palermo area. The sample was chosen by examining subjects aged 12 to 68 years. They have filled out the questionnaire anonymously and in compliance with the current privacy legislation.

The data was collected in the main points of the city of Palermo, such as schools, university, gyms, pubs and discotheques: the subjects who participated in the study were randomly chosen among those who frequented the aforementioned places; we explained the purpose of the study and they voluntarily applied to carry out the questionnaire.

We extrapolated data by using a worksheet on Microsoft Excel and then we created the graphs based on the obtained results.⁶

The survey we conducted to describe the knowledge rate on ED is simple and fast for the extrapolation of statistical data, and aims to demonstrate that knowledge on the risks associated with the use and abuse of ED is very poor. In order to make this survey more representative it would be advisable hereafter to expand the sample chosen in a longer time, perhaps proposing it in other cities.

Results

Among the interviewees only a minority (29%) have never taken ED, while the remaining 71% have tried them at least once in their life, especially in adolescence or in youth; most remember drinking their first ED at the age of 16. The first approach with ED is therefore in adolescence: this data confirms what was said by the numbers of the European Food Safety Authority reported in the introduction.¹

When asked which ED was taken, the most popular names

were certainly the most commercial and sponsored, such as Red bull®, Monster® and Burn®. This demonstrates that the advertising of these drinks affects their consumption, and that for this reason it should be appropriately regulated especially if accessible by an audience of adolescents. However, other important results have emerged from this question: not indifferent minorities have confused Sport Drinks or other types of drinks with ED, while still others have not been able to report drunk ED because it was contained within an alcoholic cocktail (Figure 1). Therefore it would be important to increase the knowledge of ED and their possible side effects.

The frequency of drinking ED among the respondents is low, in fact 81% of the interviewees said they never or rarely drink them, 14% drink them a few times a month, while 5% drink them several times a week (Figure 2); the most suited contexts to the

intake of these drinks are mainly disco, sport and study: energy drinks are in fact used to increase physical and mental performance both in recreational and work environments.

When dealing with the ED-Alcohol issue, 91% know that this association is not preferable but a small slice, represented by 9%, believe it is better to associate them (Figure 3); among the latter, the most common thought is that they help dilute and make alcoholic cocktails more pleasant, many others would not even know why, while the rest use them to counteract or increase the effects of alcohol. This is very dangerous because it can induce the consumer to further increase alcohol intake, whose depressive effects on the central nervous system will be perceived only once the stimulating effect of the caffeine has diminished. At this point, however, the symptoms of alcoholic intoxication may already be relevant and characterized, in the most serious cases, by respiratory depression.

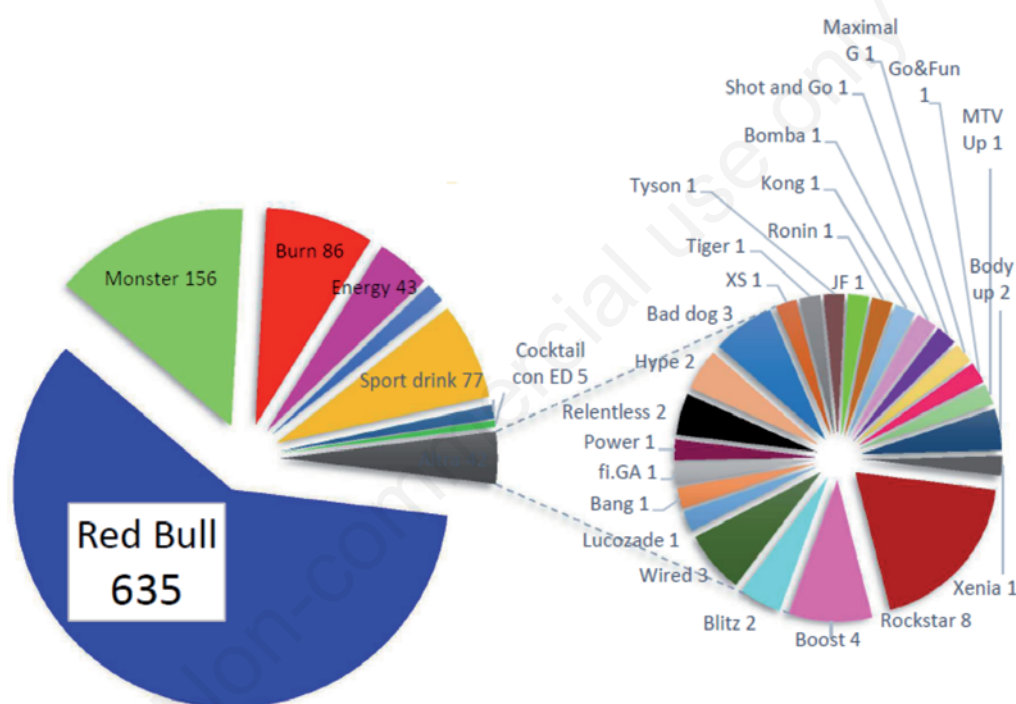


Figure 1. Type of ED consumed by the examined population.

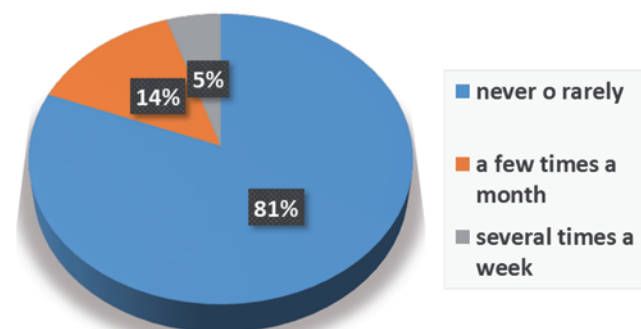


Figure 2. Frequency of consumption of ED in the examined population.

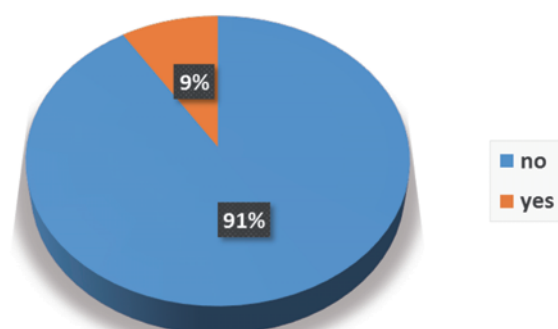


Figure 3. Consumption of ED with alcohol in the examined population.

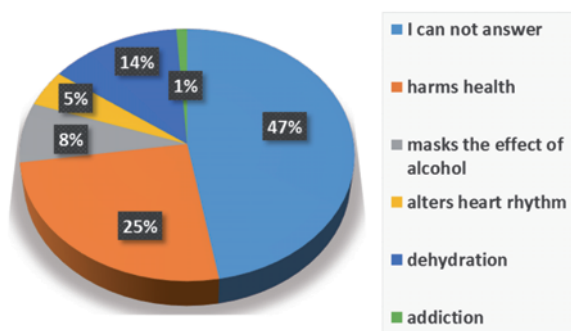


Figure 4. Risk reasons for the combined intake of ED and alcohol for the examined population.

The survey shows that 72% of respondents know that it is not preferable to drink ED with alcohol, 13% they only indulge in it on weekends, while 15% think it should be done when it happens, regardless of the day of the week. On the other hand, 14% of respondents do not believe it is risky to take ED together with alcohol, and 40% do not know if it is risky or not. On the contrary, 46% know that it can be risky; however, a large part of this category does not know how to justify the answer, another good part expresses itself by saying that it is bad for health in general, and finally a small minority knows only part of the deleterious effects that derive from it (Figure 4). It would therefore be necessary to increase the knowledge of ED, especially if associated with alcohol, through primary and secondary prevention, with information campaigns planned especially in schools, in consideration of the lowering of the age of consume children.

Conclusions

From the data we obtained, it is clear that the size of the problem cannot be underestimated: both the habitual consumption of only ED, and that associated with alcoholic beverages, are in fact a widespread reality in a large segment of the population; among other things, these issues take on even greater importance when we consider that they can affect already intrinsically fragile subjects such as adolescents.

The consumption of ED should therefore be limited, especially if associated with alcohol, through primary and secondary prevention plans that provide for information campaigns set up mainly in middle and high schools. In fact, we recall the lowering of the age of children who approach the energizing drinks: they are driven by

curiosity or the desire to integrate into groups. This is why it is necessary to convey to them reasons and useful information about the real risks they run from an excessive use of these drinks.

In Italy, among the various measures undertaken by the Ministry of Youth, it is recalled the creation of a website (www.infoenergydrink.it), where information relating to such drinks are provided. Some companies producing ED belonging to Assobibe, the Italian Association of Non-Alcoholic Beverage Manufactures, also took part in this project, which recognizes the importance of the public debate on the marketing of ED and their appropriate consumption.¹²

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