

Review

## The effect of sports and energy drink consumption on Overall health and wellness

Onur Oral<sup>1,\*</sup>, Naima Badid<sup>2</sup>, Iyanuloluwa Ojo<sup>3</sup>, PramilaThapa<sup>4</sup>, Mumtaz Enser<sup>5</sup>

<sup>1</sup>Ege University, Faculty of Sports Sciences, Department of Health Sciences and Sports, Izmir, Turkey.

\*Corresponding Author: Assoc. Prof. Onur Oral: [onur.oral@ege.edu.tr](mailto:onur.oral@ege.edu.tr)

<sup>2</sup>University Abou Bakr Belkaid, Faculty of Natural Sciences and Life, Sciences of the Earth and the Universe, Department of Biology, Tlemcen, Algeria. [badidnaima@gmail.com](mailto:badidnaima@gmail.com), [naima.badid@univ-tlemcen.dz](mailto:naima.badid@univ-tlemcen.dz)

<sup>3</sup>University College Hospital, Ibadan, Oyo State, Nigeria.

<sup>4</sup>Life Skill Education Institutes/Yeti Health Science Academy, Katmandu, Nepal.

<sup>5</sup>Dokuz Eylul University, Institute of Social Sciences, Department of Philosophy, Izmir, Turkey

### Abstract

**Background:** The aim of this study is to shed light on the physiological and metabolic effects of sports drinks and energy drinks, which are of great interest not only to sports scientists and nutritionists, but also to medical professionals with an interest in their public health implications.

**Materials and Methods:** A comprehensive search of the literature was conducted using various databases and a range of keywords, including "sports drink", "energy drink", "physical activity", "active life", and "overall health". It's intended to ensure that the search was as inclusive as possible, and we therefore included several different terms. The review encompassed a multitude of study types, including randomized controlled trials, cohort studies, and systematic reviews, with the objective of ensuring a comprehensive and diverse range of evidence, in accordance with the established best practices for such a review. To ensure a comprehensive and diverse range of evidence, the inclusion criteria for this review were established to filter studies that assess the relationship between "sports drink," "energy drink," "physical activity," "active life," and "overall health." The objective was to gain the most insight possible, and a total of 25 studies were selected for inclusion in this review. This review is concerned with the relationship between sports drinks, energy drinks, physical activity, and overall health. In order to guarantee the quality and relevance of the selected studies, the search was restricted to peer-reviewed articles published in English between 2006 and 2024.

**Results:** It would be beneficial to consider the data resulting from the investigation of the physiological and metabolic effects of sports and energy drinks, with a view to encouraging informed decision-making among consumers of these products and sports and health scientists. It would be beneficial to the extent that the scientific basis of these drinks can be explained from metabolic and physiological perspectives, to reveal the contribution of these products to a wider awareness of their roles in nutrition, performance enhancement and public health.

**Conclusion:** Sports and energy drinks have become a common feature of today's fitness and active lifestyle culture. Promoted to improve athletic performance and energy, these sports drinks are sought after by a variety of individuals, including those at the peak of their profession as professional athletes. Given that they are designed to provide a quick energy boost for the public and athletes, it seems reasonable to suggest that this product would undergo extensive physiological and metabolic analysis concerning both athletic performance and wellness.

**Keywords:** Sports drink - Energy drink - Physical activity - Active life - Overall health.

### Introduction

In the field of sports and physical activity, athletes are constantly exploring ways to enhance their performance and expedite recovery. Among the various strategies employed in this pursuit, the consumption of sports and energy drinks has attracted considerable attention. It is commonly held that these beverages are vital for maintaining hydration, replenishing energy, and enhancing overall athletic performance. However, it is of the utmost importance to gain an understanding of the differences between sports drinks and energy drinks (Cruz-Muñoz et al., 2020). It would be beneficial to examine the specific roles and effects of these drinks on the physical performance and recovery of individuals who consume them for the purpose of enhancing athletic

performance and promoting health. Sports drinks are typically formulated to replenish fluids and electrolytes that may be lost during intense physical exertion. Sports drinks are typically formulated to provide a balanced intake of water, carbohydrates, and electrolytes, which can help to maintain hydration and prevent fatigue. The study of Von Duvillard et al., (2008) suggests that these drinks may be particularly beneficial for athletes engaged in prolonged physical activity, as they can help to restore hydration and energy levels.

Sports drinks can be classified into several categories, each of which is designed to meet specific hydration requirements based on the intensity and duration of the activity (Friedhelm & Roman, 2018). Such beverages are classified as isotonic, hypotonic, or hypertonic. Energy drinks, conversely, are formulated to provide an expedient surge of energy and alertness. Such beverages frequently contain elevated levels of caffeine, taurine, guarana, and other stimulants that are thought to enhance physical and cognitive performance. Although energy drinks may confer immediate benefits such as enhanced endurance and improved focus, it is crucial to recognize that they can also present potential health risks, particularly when consumed in excess or in conjunction with alcohol (Gunja & Brown, 2012; Peacock et al., 2014). It is important to note that the caffeine content of energy drinks can vary significantly, with some products containing more than 500 mg per serving. This gives rise to concerns regarding the potential toxicity of caffeine and its associated health effects, as elucidated by Ishak et al. (2012). It would be beneficial to conduct a comprehensive investigation into the consumption patterns of these beverages among athletes, with particular attention to adolescents and young adults. This is because research has indicated that energy drink consumption may be associated with a range of negative effects, including increased anxiety, depression, and risky behaviors (Ajibo et al., 2024; Utter et al., 2018). Furthermore, given that these beverages are often marketed toward younger demographic groups, there are concerns about children and adolescents' access to and consumption of them (Soós et al., 2021; Schneider et al., 2011).

The field of sports and energy drinks is diverse, and given that each category serves different purposes and contains unique formulations, it is crucial for athletes and individuals of all ages who consume these products to have a comprehensive understanding of the ingredients and their intended effects. The primary function of sports drinks is to replenish fluids and electrolytes lost during physical exertion. They typically contain a combination of water, carbohydrates, and electrolytes such as sodium, potassium, and magnesium. The carbohydrate content typically ranges from 4% to 8%, which is known to have important implications for athletic performance, as it provides a quick source of energy during prolonged exercise (Burke et al., 2006; Maughan, 2009). The incorporation of electrolytes into sports drink formulations is crucial for maintaining fluid balance and preventing hyponatremia, a condition characterised by low sodium levels in the blood due to excessive sweating. This is essential for maintaining healthy physical activity (Friedhelm & Roman, 2018).

It is worth noting that energy drinks are often formulated to provide a rapid boost in energy and mental alertness, which often results in the inclusion of high levels of caffeine, taurine, guarana, and other stimulants. Caffeine, the primary ingredient in energy drinks, is known for its ergogenic effects, which have been shown to enhance endurance performance and delay fatigue during exercise (Del Coso et al., 2012; Hoffman, 2010; Ishak et al., 2012). Additionally, many energy drinks contain a wide variety of vitamins and amino acids that are marketed as performance enhancers, although their true benefits are still a matter of debate (Gunja & Brown, 2012; Salokhiddinova, 2023).

However, a study conducted by Buxton and Hagan (2012) aimed to gain insight into energy drink consumption among student-athletes in Ghana, to inform health education interventions regarding safe consumption practices. The findings indicated that there is a notable prevalence of energy drink consumption among student-athletes, which appears to be driven by a desire for improved performance and increased energy. It would seem that there may be room for improvement in terms of awareness of the potential health risks associated with excessive energy drink consumption, such as cardiovascular problems and sleep disorders. It might be beneficial to consider implementing targeted health education programs to increase awareness and promote safe consumption practices. It might be beneficial to consider focusing such programs on potential risks, the importance of moderation, and the benefits of alternative strategies to increase performance and energy levels.

## Materials and methods

A comprehensive search of the literature was conducted using a range of databases, including the US National Library of Medicine (PubMed), Scopus, EBSCO, MEDLINE, DRJI (Directory of Research Journal Indexing), Embase, Web of Science, Google Scholar, and SportDiscus. To gain a comprehensive understanding of the subject matter, it was thought that some keywords should be selected for the search. To gain a comprehensive understanding of the subject matter, some key search terms were selected for the search, including "sports drink", "energy drink", "physical activity", "active life", and "overall health". In addition, further relevant literature was identified through the examination of reference lists derived from the data searches. To focus on

the most relevant results, the search was limited to peer-reviewed articles published in English between 2006 and 2024. To gain a comprehensive understanding of the relationship between sports drink, energy drinks physical activity, and overall health, it was necessary to meet certain criteria. Firstly, the relationship between physical activity, overall health, and sports drinks or energy drinks had to be examined. Secondly, the studies had to be published in a peer-reviewed journal. Thirdly, the studies had to be in English. Following a rigorous selection process, 25 studies were chosen to be included in this review.

## Results and discussion

It would seem that the consumption of energy and sports drinks has become quite widespread among athletes, adults and adolescents who are seeking to enhance their performance and recovery. It would be beneficial to make a distinction between these two types of drink, as they serve different purposes and contain different ingredients. Sports drinks are formulated with the specific intention of replenishing fluids lost during physical activity. Energy drinks, on the other hand, are designed with the aim of increasing energy levels through the use of stimulants such as caffeine, guarana, taurine and ginseng (Schneider et al., 2011; Meadows & Ryan, 2007; Richards & Smith, 2016). It is thought that energy drinks may help to improve performance, concentration and endurance. Sports drinks, on the other hand, are designed to help restore hydration and electrolytes (Gunja & Brown, 2012; Breda et al., 2014).

A substantial body of scientific literature has identified the fundamental characteristics of sports and energy drink consumption habits among athletes and non-athletes. This research has revealed that athletes frequently consume sports drinks during training and competition to maintain optimal hydration and energy levels. A study conducted by Simulescu et al., (2019) also demonstrated that athletes who regularly consumed sports drinks reported superior performance and recovery outcomes compared to those who did not. Conversely, a study conducted by Seifert et al. (2011) revealed concerning trends in energy drink consumption among adolescents. This research study highlighted that approximately 30% of high school students regularly consume energy drinks, and most of them are unaware of the potential health risks associated with high caffeine intake. Collectively, these studies emphasize the necessity for heightened awareness and education regarding the distinctions between sports and energy drinks and their impact on health and performance.

Some studies have indicated that energy drink consumption may have a beneficial effect on cognitive performance, with participants who consumed energy drinks showing improved reaction times and alertness compared to the placebo group (Chtourou et al., 2019). While the impact of energy drink consumption on cognitive performance has been demonstrated to be beneficial in these studies, it is important to consider that excessive intake of this product may potentially result in adverse effects, such as anxiety and insomnia, particularly in individuals who are sensitive to certain active ingredients present in energy drinks (Kaur et al., 2020; Poon et al., 2024; Rath, 2012).

A study conducted by Utter et al. (2018) evaluated the behavioral effects of energy drink consumption among adolescents. The results of this study indicated that frequent energy drink consumption was associated with an increase in risky behaviors such as excessive drinking and unsafe sexual practices. Upon closer examination of these findings, it became evident that there may be a need for targeted interventions to reduce the accessibility and consumption of these products among adolescents.

## Conclusion

It seems that sports drinks and energy drinks are becoming more and more popular among athletes and those who have managed to establish regular physical activity habits in their lives. While these drinks are often used with the intention of improving performance, replenishing electrolytes and supporting recovery, there seems to be a consensus that a comprehensive review of existing scientific publications would be beneficial in order to gain a deeper understanding of the effects that these drinks have on physical performance and recovery. Sports drinks are specially formulated beverages containing carbohydrates, electrolytes and sometimes vitamins and minerals. They are intended to replenish fluids and provide energy during prolonged or intense exercise. It would seem that clinical studies have indicated that sports drinks may be helpful in maintaining hydration (body water content), delaying fatigue and increasing endurance when consumed before or during physical activity. Carbohydrates, the main ingredient in sports drinks, can provide energy for working muscles and potentially enhance athletic performance while delaying fatigue. The easily absorbed carbohydrates in sports drinks are a quick and effective energy source during exercise. Electrolytes like sodium and potassium found in sports drinks help maintain proper fluid balance. Additionally, the water content in sports drinks can replace water lost

through sweat during physical activity, meeting hydration needs. Overall, considering the physiological and metabolic contributions of sports drinks, it is reasonable to suggest that they may contribute to improved physical performance. Energy drinks and sports drinks differ in their ingredients and intended effects. While sports drinks focus on hydration and replenishing energy, energy drinks aim to provide quick mental and physical stimulation. The caffeine in energy drinks can enhance alertness, concentration, and perceived energy levels. Scientific studies suggest that the high caffeine content may improve short-term physical performance, especially in activities that require focus and mental acuity. However, excessive consumption of energy drinks may have negative effects on physical performance. Additionally, energy drinks often contain high amounts of sugar, which can cause fluctuations in blood sugar levels. It is important to be cautious when consuming energy drinks and to consider the potential negatives of their ingredients. In light of the evidence, it appears that the impact of sports and energy drinks on physical performance and recovery is evident. It seems that there is evidence to suggest that sports drinks may have the potential to delay fatigue and help post-exercise recovery by increasing endurance with a balanced combination of carbohydrates and electrolytes. It is also worth noting that energy drinks with high caffeine content can provide a short-term boost in performance. However, it is important to be mindful of the potential negative effects these drinks may have on overall physical performance and recovery.

### **Acknowledgment**

We would like to express our special thanks to Dr. George N. Nomikos for his very successful contribution to the literature research process and unique academic support in the publication during the process of this review article.

### **Conflict of interest**

The author certifies that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

### **Funding**

The author certifies that there is no funding from any financial organization regarding the material discussed in the manuscript or contributions

### **Author contributions**

All the authors read and approved the final version of the manuscript.

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