

Imagem corporal e distúrbios alimentares em jovens atletas: Uma revisão narrativa da literatura
Body image and eating disorders in young athletes: A narrative review of the evidence

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Abstract and keywords

Eating disorders (EDs) are severe psychiatric illnesses marked by persistent disturbances in eating or related behaviours, often evolving through progressive phases of dietary restriction. Normal eating habits involve a balanced intake of nutrients to meet physiological needs, with occasional dietary variations and cravings. In contrast, EDs manifest through specific pathological criteria and can present as clinical or subclinical conditions. Psychological disorders such as anxiety, depression, and obsessive-compulsive behaviours frequently coexist with EDs, further compromising both mental and physical health.

Adolescents, particularly girls, are at heightened risk due to stressful changes during puberty, which can distort body image and increase susceptibility to DE. In athletes, the prevalence of disordered eating (DE) and EDs is increased due to the competitive and high-pressure environment that prioritizes performance, body image, and weight management. Sports demanding specific body characteristics, such as aesthetics and weight categories, exhibit higher incidences of these disorders. Despite growing awareness and serious consequences, EDs remain under-reported and under-diagnosed.

Keywords: Adolescent; disordered eating; health; performance.

Resumo e palavras-chave

Os distúrbios do comportamento alimentar são doenças psiquiátricas graves marcadas por perturbações persistentes no comportamento alimentar ou comportamentos relacionados, onde a restrição alimentar pode evoluir progressivamente. Os hábitos alimentares normais envolvem uma ingestão equilibrada de nutrientes de forma a satisfazer as necessidades fisiológicas, com variações e desejos ocasionais por determinados alimentos. Em contrapartida, os distúrbios manifestam-se através de critérios patológicos específicos e podem apresentar-se como condições clínicas ou subclínicas. As perturbações psicológicas como a ansiedade, a depressão e os comportamentos obsessivo-compulsivos coexistem frequentemente com os distúrbios do comportamento alimentar, o que acaba por comprometer ainda mais a saúde mental e física.

Os adolescentes, em particular as raparigas, apresentam um maior risco de desenvolver estes distúrbios, devido às alterações corporais que ocorrem durante a puberdade, que podem distorcer a imagem corporal. Nos atletas, a sua prevalência aumenta devido ao ambiente competitivo e pressão existente, onde existe um cuidado acrescido com o desempenho, imagem corporal e gestão do peso. Os desportos que exigem características corporais específicas, como a estética e as categorias de peso, apresentam uma maior incidência destas perturbações. Apesar da crescente consciencialização e das suas graves consequências, os distúrbios do comportamento alimentar continuam subdiagnosticados.

Palavras-chave: Adolescente; distúrbios alimentares; saúde; desempenho.

Lista de abreviaturas, siglas e acrónimos

AN- Anorexia nervosa

BN- Bulimia nervosa

DE- Disordered eating

EA- Energy availability

ED- Eating disorder

FFM- Fat free mass

LEA- Low energy availability

RED- Relative energy deficiency

Summary

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Introduction

There are more and more young athletes due to the obvious advances in youth sport⁽¹⁾, and with this comes weight concerns⁽²⁾.

An athlete must bear in mind that certain sports have different requirements, for example, endurance athletes (marathons) must have a low fat mass percentage, while aesthetic sports such as ballet require thinness⁽³⁾. In order to lose weight and fat mass, or to gain weight and muscle mass, athletes may adopt unhealthy strategies⁽²⁾.

However, many athletes have a wrong perception about what the perfect athletic body is, mixing up the concept of an aesthetic body with that of an athletic body is, which do not always converge into the best performance. In addition to the pressure to achieve or maintain a certain body type, athletes also have the requirements to perform at their best⁽⁴⁾.

It is known that athletes⁽⁵⁻⁸⁾ are more susceptible to developing disordered eating (DE) and eating disorders (EDs), both in adult and younger population^(7, 9-11). However, adolescents are more susceptible than the general population, as it is a phase of many changes, such as body weight gain, hormonal and behavioural oscillations⁽¹²⁾. Developing DE or EDs can lead to serious consequences and impact physical health, psychological well-being, and athletic performance⁽¹³⁾.

Objectives

The main aim of this study is to review characterization of EDs, its contributing factors, complications; Influence and prevalence in sports and particularly in young athletes.

Methodology

The databases used to search for scientific articles were PubMed and Science Direct. The search took place between March and June 2024. In order to obtain as many articles related to the topic as possible, the following set of words was selected as the search strategy: “eating disorders”, “disordered eating”, “sports”, “sporting”, “exercise”, “exercising”, “training”, “athlete”, “player”, “youth”, “young”, “adolescent”, “children”, “child”, “puberty”. A total of 1386 articles was obtained, however, it was only possible to obtain the free full text of 521 articles. Priority was given to systematic reviews and meta-analyses. Randomised controlled trials and clinical trials were also sought. Ultimately, the selection criteria were based on the relevance of the title and abstract. A total of 105 articles written in English and Portuguese and published between 1981 and 2024 were analysed, but only 81 articles were selected and included in this paper.

Eating disorders and disordered eating

EDs are psychiatric illnesses characterized by persistent alterations in eating or eating-related behaviours^(11, 14, 15). The development of these disorders progresses through phases, often beginning with changes in eating habits, adherence to

specific rules or diets, which may escalate into a more restrictive diet involving the total or partial exclusion of certain foods or food groups⁽⁴⁾.

Before defining DE and EDs, it is important to distinguish them from normal eating habits. Normal eating involves consuming sufficient nutrients and calories to meet the body's functional needs, through a diet that is healthy, varied, and balanced. Variations in diet and occasional cravings are natural components of normal eating⁽¹¹⁾.

Although EDs share common symptoms with DE, they are diagnosed based on specific pathological criteria, with variations in severity ranging from clinical to subclinical manifestations^(16, 17). Subclinical cases, where not all diagnostic criteria are met, are classified as DE ^(18, 19) and can serve as a precursor to more severe EDs as behaviours become increasingly frequent and restrictive⁽¹¹⁾.

Psychological disorders such as anxiety, depression, substance abuse, and obsessive-compulsive disorders are prevalent among individuals with EDs and indicate poor mental health^(20, 21).

The most characteristic abnormal behaviours in athletes may be constant focus on food, calories, body shape, and weight; black-and-white thinking, particularly concerning food, body image, or exercise; avoidance of social events that involve food; restrictive eating habits, such as eliminating certain food groups, nutrients, or reducing overall energy intake, and meticulously counting, measuring, and weighing food; frequently going to the bathroom after meals; signs of binge eating, such as purchasing or consuming large quantities of food and hiding food wrappers; alternating between food restriction and binge eating; secretive behaviours about eating and exercise habits; rigidity or inflexibility in various

situations⁽¹⁹⁾. Nevertheless, behaviours like use of appetite suppressants and laxatives, starvation, fasting, skipping meals and overeating are also common^(4, 18). These behaviours contribute to compromised physical health and reduce quality of life^(14, 15, 22).

EDs and DE are particularly common among adolescent girls^(9, 23) and can be identified by physical signs such as significant bodyweight changes, dizziness, fainting, and weakness⁽¹⁶⁾. However, body weight alone is not a definitive diagnostic indicator, as individuals with EDs may present as underweight, normal weight, or even overweight⁽²⁴⁾.

EDs are classified as feeding and eating disorders, encompassing conditions like Pica (persistent eating of nonnutritive/food substances), Rumination Disorder (repeated regurgitation of food), Avoidant/Restrictive Food Intake Disorder (persistent disturbance; e.g.: evident disinterest in eating or food), Binge Eating Disorder (consuming without any control a quantity of food in a short period that is significantly more than what most people would eat), and Other Specified Feeding or Eating Disorders (combines symptoms characteristic of EDs, but does not meet all the specific requirements for diagnosing an EDs)^(14, 15). Anorexia nervosa (marked by severe restriction of food intake or specific dietary habits)⁽²⁵⁻²⁹⁾ and bulimia nervosa (characterized by binge eating followed by purging behaviours)⁽²⁵⁻²⁹⁾ are particularly common among athletes. Cases that do not meet all diagnostic criteria for specific EDs are diagnosed as ED Not Otherwise Specified^(25, 29).

Identifying eating disorders can be challenging due to the diverse presentation of symptoms—psychological, physical, and behavioural^(14, 15, 30). It is possible for

individuals to outwardly appear normal and maintain a healthy weight while exhibiting disordered eating behaviours⁽²⁵⁾.

Risk factors for disordered eating and eating disorders

DE and EDs can manifest in any individual, since they do not have any specific pattern⁽¹⁹⁾ and are not a choice⁽¹⁷⁾. However, athletes, are more susceptible to developing these conditions than non-athletes⁽²¹⁾.

The development of DE and EDs is multifactorial^(25, 31-35), including^(11, 19, 36-39):

- Biological risk factors such as age, puberty, and stage of growth/development;
- Psychological risk factors, including body image distortion, perfectionism, and low self-esteem;
- Sociocultural risk factors, such as influences from social media and public figures;
- Gender-based factors, including stereotypes and pressures related to leanness;
- Sport-specific risk factors, such as injuries and weight management challenges;

Sport itself plays a significant role, as athletes face heightened vulnerability due to the competitive and stressful environment. There are pervasive myths and pressures regarding peak performance, body image ideals and financial success^(5, 25, 40-42). Which can lead to an unhealthy obsession with food, body weight, body image, and body composition⁽⁴⁾. Despite athletes' intentions, their thoughts and emotions can manifest in actions and behaviours that compromise their health⁽⁴⁾.

Eating disorders in children and adolescents

DE and EDs are increasingly prevalent among younger populations⁽⁹⁻¹¹⁾. Research indicates that experiencing DE and EDs during childhood or adolescence heightens the risk of developing these disorders in the future^(25, 43, 44) or a heightened risk persisting into adulthood^(14, 15, 22).

EDs are more commonly reported among girls, reaching a prevalence of 3,8%, when compared to 1,5% of boys, particularly in the age groups of adolescence, where the prevalence is 3,0% between 17-18 years old, 2,8% in 15-16 year olds and 2,4% at 13-14 years old⁽⁴⁵⁾.

During adolescence, growth and development are critical and influence long-term health. Nutrition during adolescence affects puberty timing, adult height, muscle and fat mass, and the risk of non-communicable diseases⁽⁴⁶⁾. Simultaneously, adolescence is a critical phase for body image development, marked by widespread insecurities and dissatisfaction with body shape and size⁽¹²⁾. The perception of body image is intricate and influenced by factors such as peers, family, social media influencers, and social networks⁽⁴⁷⁾. Young people today have extensive access to the internet and social media, exposing them to heightened pressures and societal norms regarding body image⁽⁴⁸⁾.

There is significant social pressure for girls to aspire to thinness and for boys to achieve muscularity, further exacerbating body dissatisfaction^(49, 50), with this ideology so present today, it's no wonder that orthorexia is increasingly present in teenagers⁽⁵¹⁾. Although orthorexia nervosa is not included in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, it is nonetheless a concern,

as it consists of an excessive obsession with healthy eating that leads to malnutrition and can be a first step towards the development of anorexia^(51, 52).

There is also an increased susceptibility to developing DE during this period⁽⁹⁻¹¹⁾, since puberty brings significant bodily changes, including hormonal and behavioural oscillations, body weight gain, reshapes in size, proportion and composition, which can contribute to the development of distorted body image⁽¹²⁾. However, girls find it more difficult to adapt to the bodily changes characteristic of maturation, which promotes adherence to maladaptive behaviours⁽¹²⁾.

Moreover, behaviours such as feeling guilty about eating certain foods, skipping meals, and engaging in extreme diets are increasingly normalized among young people⁽¹¹⁾.

Eating disorders in sports

Young people, particularly athletes, face an elevated risk of developing eating disorders compared to the general population^(5-7, 21, 25, 45, 53, 54). The demands of athletic practice extend beyond physical requirements, creating a unique environment where competitiveness and perfectionism often contribute to DE behaviours, notably bulimic ones^(55, 56).

Research indicates a correlation between higher fat mass percentages and increased energy needs, which can impact athletic performance negatively⁽⁵⁷⁾. Consequently, there is a perception that lower fat mass percentages may enhance performance, prompting athletes to adopt varied eating habits that may not align with conventional norms⁽⁴⁾. This makes it challenging to differentiate between

distorted eating habits and those considered typical for athletes within their sporting communities^(4, 25).

Various sports require distinct athletic skills and physical characteristics⁽¹⁹⁾, with some placing significant emphasis not only on performance but also on body image and weight categories that prioritize aesthetics, optimal shape and minimal fat^(5-7, 25, 45, 53, 54). Research indicates that sports involving specific weight requirements, aesthetic considerations and endurance sports have a higher predisposition to fostering DE and EDs^(3, 53, 58).

Knowing that the prevalence is higher in women(14,0%)^(7, 37, 53) it's important to identify the sports with higher incidence rates. Generally, sports with a greater prevalence of EDs among female athletes are those that emphasize leanness or specific weight requirements, including aesthetics-driven sports (e.g. gymnastics) and endurance sports (e.g.: long-distance running)^(4, 25, 36). In contrast, the prevalence is 3,2% among male athletes⁽⁷⁾, especially in anti-gravity sports (e.g.: ski-jumping), weight-category sports (e.g.: judo, kickboxing), and endurance sports (e.g.: cycling)^(4, 25).

Athletes, driven by their performance goals, often adopt extreme behaviours that lead to low energy availability (LEA)⁽⁵⁹⁾. Energy availability (EA) is determined by subtracting daily energy intake from daily energy expenditure during exercise⁽⁶⁰⁾ and dividing the difference by an athlete's fat free mass (FFM) in kilograms. To maintain body weight and physiological functions the EA should be approximately 45 kcal/kg FFM/day, while to lose weight/fat mass in a healthy manner, EA should be 30-45 kcal/kg FFM/day. The consequences of LEA appear when the deficit is greater than 30 kcal/kg FFM/day, particularly in female athletes⁽⁶¹⁾.

The imbalance caused by LEA compromises basic biological mechanisms, making it a significant precursor to diagnosed EDs^(59, 62, 63), often presenting as their trigger^(64, 65). Once the physiological needs imposed by the high intensity and volume of training are higher than the normal population, the possibility of aggravating the consequences of these actions should be considered⁽¹²⁾.

Malnutrition and purging practices among athletes result in adverse health outcomes such as hypokalaemia, metabolic alkalosis, oedema, low potassium and creatinine levels, and dehydration^(12, 66) which results in outcomes like greater susceptibility to injury, difficult recovery from injury, inconsistent performance or muscle cramps⁽¹³⁾. These factors detrimentally affect athletic performance, influencing competitive outcomes⁽²⁵⁾.

Furthermore, EDs can lead to severe morbidities including anaemia, arteriosclerosis, hypertension, elevated cholesterol and triglycerides ⁽⁶⁷⁻⁷⁰⁾ myocardial impairment, prolonged recovery times, cardiac failure, organ failure, suicide^(13, 26), and amenorrhea in women⁽²⁶⁾. Notably, female athletes are more susceptible to these consequences, particularly reflecting the female athlete triad, which encompasses menstrual disturbances (menarche, amenorrhea, irregular cycles), and decreased bone mineral density (osteoporosis, osteopenia), among other symptoms of the relative energy deficiency in sport (REDs)^(9, 29, 60, 71-74). A study reported that amenorrhea (one of the consequences of EDs) was more common in ballet dancers who exercised excessively than in female athletes who had a low body weight⁽⁷¹⁾.

Regardless the increasing recognition, EDs remain under-reported and under-diagnosed⁽⁷⁵⁾ and extra attention should be given this population, since even small

variations can severely compromise the health and performance of athletes⁽⁵⁸⁾, further increasing susceptibility to REDs⁽⁷⁴⁾.

Early detection is crucial as prolonged illness can escalate to chronic conditions with more severe outcomes⁽⁷⁶⁾ and early intervention significantly enhances the prospects of recovery^(25, 43).

The role of Sports Nutritionist in disordered eating and eating disorders

It is crucial to recognize that the treatment of EDs requires a multidisciplinary approach involving professionals from Nutrition, Medicine, and Psychology, emphasizing that diagnosis and treatment are not solely the domain of nutritionists⁽¹⁹⁾.

Nevertheless, nutritionists play a pivotal role in several key phases of managing EDs. In primary prevention, nutritionists can conduct educational sessions on the characterisation, risk and consequences of DE/EDs, ideally starting with athletes aged 9-11 years old⁽⁷⁷⁾. In secondary prevention, they may focus on identifying problematic behaviours and psychological factors to facilitate early screening of these conditions⁽¹²⁾.

When it comes to screening, there are tools that are considered gold standards, such as the "Eating Disorder Examination", which is a diagnostic interview that uses the "Eating Disorder Examination Questionnaire", which facilitates the assessment of the frequency, severity and range of characteristic eating behaviours in the diagnosis of EDs⁽⁷⁸⁾.

In larger stages, nutritionists have a crucial role in the treatment of DE/EDs, as they are responsible for readjusting energy and nutritional intake, to optimize and stabilize body weight^(59, 79). Only then should their focus shift to enhancing athletic

performance⁽²⁵⁾. Nutritionists must possess a comprehensive skill set, including knowledge of appropriate methods for diagnosing and monitoring EDs, understanding dietary restrictions and management of food allergies and intolerances, recognizing behaviours and attitudes towards food, conducting accurate assessments of body composition, understanding healthy and harmful methods of weight control, and identifying factors influencing body image⁽¹⁹⁾.

In practical terms, when devising meal plans and monitoring athletes progress, nutritionists must tailor their approach to meet the physical, mental, and specific sport-related needs of the individual. This involves ensuring adequate intake of all essential macronutrients and micronutrients without excluding any food groups, and promoting a positive body image perception^(19, 25).

Critical Analysis

It is imperative for every sports organization to establish specific guidelines for preventing and identifying DE early within their sport. These guidelines should ensure the screening, diagnosis, monitoring and continuous care of the athletes with DE/EDs, address the unique aspects of each sport, and uphold the fundamental principle of 'first do no harm' concerning athlete body composition, body image, nutrition, health and performance⁽⁷⁷⁾. Sports organizations bear a responsibility to foster a healthy sporting environment and culture for all athletes across the high-performance pathway⁽⁵⁷⁾.

Understanding the athlete's environment beforehand increases the likelihood of implementing more effective preventive measures, despite the challenges in diagnosing EDs⁽⁸⁰⁾. Sporting entities must comprehend how their sport's rules may

impact athletes' eating habits and advocate for rule adjustments to mitigate practices that could contribute to DE or EDs^(19, 57). For example adjustments to weight categories in combat sports that require it, such as judo, in order to avoid acute weight losses before weigh-ins⁽⁸¹⁾.

Promoting a positive body image is crucial in safeguarding against the development of eating disorders and forms a vital part of comprehensive prevention programs⁽¹⁹⁾. Overall, establishing a robust and supportive nutrition framework is essential to create a healthy sports system that prioritizes safe, individualized, and purposeful nutrition practices.

It is extremely important that coaches recognize the severity and prevalence of EDs, understand that an athlete's value transcends mere performance or appearance⁽⁴⁾. Successful identification, prevention, and treatment of EDs in athletes necessitate a collaborative effort involving coaches, athletic trainers, parents, athletes themselves, and healthcare professionals^(6, 8).

Conclusions

In conclusion, the etiopathology of EDs and DE is very complex and multifactorial, and these conditions pose significant risks to both the mental and physical health of young athletes.

Recognizing the signs and symptoms of EDs is essential, yet challenging, as individuals can have abnormal eating behaviours and at the same time display a healthy physical appearance. The different diseases, requires precise diagnosis and specific treatment approaches.

The athletic population which in, itself, is already more susceptible to developing EDs due to the constant pressure to perform well and sport-specific body image

standards, is even greater at risk at young ages, since puberty and social pressure play an important role in the development of body image concerns.

The nutritionist can act through educational initiatives and early screening, of at-risk individuals, as well as implementing strategies to restore healthy eating habits and positive body image perceptions. Multidisciplinary collaboration, involving medical and psychological experts, enhances the effectiveness of the interventions.

Thus, tailored nutritional guidance is crucial to support athletes in achieving a balance between peak performance and overall well-being, emphasizing the importance of mental health, balanced nutrition, and positive body image.

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