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The growing relevance of bigorexia nervosa in sport and fitness settings: current evidence and clinical implications

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Abstract

Introduction: In recent years, bigorexia has gained increasing attention as a mental health issue closely linked to the rise of contemporary fitness culture promoting extreme muscularity, reduced body fat, and appearance-oriented lifestyles. The condition involves a distorted perception of one's physique, accompanied by a persistent belief of being inadequately muscular despite often having a well-developed body.

Aim: This review aimed to summarize and critically discuss current findings on bigorexia, focusing on its epidemiology, contributing risk factors, symptomatology, diagnostic challenges, and available treatment strategies.

Review findings: Bigorexia predominantly affects individuals participating in bodybuilding and other strength-focused activities, especially men, although emerging evidence suggests that women may also be affected more frequently than previously recognized. The disorder is frequently overlooked in clinical practice, partly because its symptoms overlap with other psychiatric conditions such as depressive disorders, anxiety disorders, eating disorders, and occasionally psychotic spectrum disorders. Accurate differential diagnosis is therefore crucial. Although evidence regarding treatment remains limited, psychotherapy constitutes the cornerstone of management, with cognitive-behavioral therapy demonstrating the greatest effectiveness. In some patients, pharmacological support may additionally be considered.

Conclusions: Greater awareness of bigorexia among clinicians and society is necessary to facilitate earlier identification and more effective intervention. Additional research is needed to better define the disorder, clarify gender-related differences, and develop evidence-based therapeutic approaches.

Key words: bigorexia nervosa, muscle dysmorphic disorder, body image disturbance, eating disorders

1. Introduction

The recent dynamic rise in the popularity of fitness culture, with a strong emphasis on physical appearance, low body fat, and high levels of muscularity is accompanied by increasing use of dietary supplements, strict nutritional regimes, and, in some cases, potentially harmful substances such as anabolic steroids. As a result, bigorexia nervosa (BN) has emerged as a significant and growing health concern. It has also been described in the literature under alternative terms, including reverse anorexia, muscle dysmorphia (MD) and Adonis complex [1].

Bigorexia can be described as a mental disorder characterized by an obsessive preoccupation with achieving a lean and highly muscular physique. Individuals perceive themselves as insufficiently muscular and "too small," despite evidence to the contrary [2]. It is often associated with dissatisfaction with one's physical appearance, excessive and intensive training, and the maintenance of strict and restrictive dietary practices. Individuals with this condition frequently engage in rigid body weight control and may use anabolic steroids to increase muscle mass. These behaviors are commonly accompanied by interpersonal difficulties [3].

Bigorexia remains a relatively new phenomenon in scientific research. Traditionally, scholarly attention on eating disorders and body image disturbances has focused primarily on women, particularly their pursuit of thinness and distorted perception of their bodies. This female-oriented framework has shaped existing diagnostic criteria and theoretical models. However, such an approach may not adequately capture the experiences of men, who are more likely to strive for a muscular physique rather than thinness. Consequently, it has been suggested that a new perspective on bigorexia is needed, including the development of more appropriate theoretical frameworks as well as diagnostic tools tailored specifically to this population [4].

The classification of bigorexia remains contested, with ongoing debate as to whether it is more closely aligned with eating disorders or obsessive-compulsive spectrum disorders. Moreover, the presence of features resembling addictive and substance-related behaviors adds further complexity [5,6]. BN can be conceptualized within the broader category of body dysmorphic disorders (BDD). In the ICD-10 and ICD-11 it is classified as body dysmorphic disorder [7,8]. The DSM-5 classifies bigorexia as a body dysmorphic disorder, which is categorized within the spectrum of obsessive–compulsive and related disorders [9].

2. Purpose and methods

The aim of this review was to synthesize the existing literature on BN in order to provide a comprehensive overview of the disorder. It sought to integrate current knowledge regarding clinical presentation, associated risk factors, and therapeutic approaches, thereby offering a structured summary of these aspects.

This study constitutes a narrative review of the literature on bigorexia published within the last decade (2016–2026). The review included peer-reviewed articles published in both English and Polish. Research query was conducted using the following databases: Google Scholar, PubMed, Cochrane Library, and ResearchGate, and was complemented by a snowballing technique to identify additional relevant publications through the reference lists of included studies. The search strategy was based on the following keywords: *"bigorexia nervosa" "muscle dysmorphia," "Adonis complex," "reverse anorexia,"* and *"body dysmorphic disorder."*

Studies were selected according to their relevance to the topic, with particular emphasis on epidemiology, etiology, symptoms, diagnosis and treatment of muscle dysmorphia. The extracted data were then subjected to qualitative synthesis in order to provide an integrative overview of the current state of knowledge regarding muscle dysmorphia.

3. Current knowledge

3.1. Prevalence

It is estimated that body dysmorphic disorder affects approximately 1–3% of the general population. The disorder most commonly emerges in adolescence and early adulthood, with the highest risk observed between the ages of 15 and 35 years [10]. However, among individuals engaged in regular physical activity, the prevalence may be considerably higher. Epidemiological studies in this area remain limited, and substantial methodological differences across research make accurate estimation difficult. Nevertheless, available data suggest that

among bodybuilders, symptoms of bigorexia may range from approximately 8.3% to as high as 58% [1,11].

Although BN is more frequently reported in men, research on women remains limited, and their clinical presentation may differ, which complicates accurate prevalence estimates in the general population [12]. However, emerging evidence suggests that prevalence rates may not differ substantially between genders, with apparent discrepancies potentially reflecting variations in symptom expression and diagnostic approaches rather than true epidemiological differences [13]. Moreover, gender differences in the focus on specific body areas further underline the importance of accounting for distinct body image concerns when analysing this disorder [1]. Among women, BN tendencies are more common in those practicing strength training compared to fitness training. These tendencies are also linked to a more androgynous psychological gender [14]

Recent research indicates that gay men report higher levels of muscularity-oriented eating behaviors, bigorexia, and exercise addiction compared to heterosexual men [15].

3.2. Risk factors and mechanisms

Muscle dysmorphia and eating disorders appear to be driven by overlapping underlying mechanisms, sharing a number of similar features. In particular, sociocultural pressures play a crucial role in shaping body dissatisfaction, often strengthened by the internalization of culturally promoted body ideals [16]. Thus, BN appears to be strongly influenced by sociocultural factors. Dysfunctional use of social media can expose individuals to unrealistic body image ideals, which may contribute to the development of both eating disorders and BN [17]. Certain online behaviors, including frequent photo editing, prolonged screen exposure, and social media addiction, may additionally contribute to the development of the disorder. Other relevant factors include weight-related stigma and perfectionistic tendencies focused on physical appearance. Psychological determinants also play an important role and interact with sociocultural pressures. Traits such as vulnerable narcissism, diminished self-esteem, heightened sensitivity to criticism, difficulties in regulating emotions, and fear of negative judgment have been associated with BN. Moreover, the condition is linked to a range of broader psychological issues, including social withdrawal, alexithymia, or dissociative experiences [11,18]. Individuals with BN, compared with the general population, more frequently present with a history of psychiatric conditions, including eating disorders, mood and anxiety disorders, substance use disorders, and body dysmorphic disorder. They are also more likely to have

attempted suicide [19]. Both single relationship status and a greater number of past romantic and sexual relationships have been reported as factors associated with BN [11].

The use of anabolic-androgenic steroids represents a well-documented risk factor for BN, with affected individuals typically demonstrating greater symptom severity and more pronounced clinical features [8].

Anabolic-androgenic steroid (AAS) use has a complex relationship with BN. While increased muscularity may temporarily reduce body dissatisfaction, underlying psychosocial issues often persist and can worsen symptoms [20]. AAS may act as a maintaining factor, with users showing more pronounced patterns of behaviors such as strict dieting and excessive exercise. However, findings remain inconsistent, and the relationship requires further investigation [21].

Biological mechanisms underlying BN remain poorly understood, and most evidence is extrapolated from studies on body dysmorphic disorder. Current research suggests potential involvement of neurocognitive deficits, particularly in executive functioning (e.g., planning and response inhibition), as well as possible alterations in serotonin regulation. Genetic factors may also contribute, as a family history of body dysmorphic disorder or obsessive-compulsive disorder is associated with an increased risk [7]

Among the significant determinants of BN is the type of sport practiced. Athletes involved in weightlifting seem particularly vulnerable [11], while participation in team sports is linked to lower levels of body dissatisfaction and, therefore, a decreased likelihood of developing the condition [8]. The frequency of physical activity also appears to be relevant, as some studies indicate that training more than five times per week is associated with a higher prevalence of eating disorders and BN [22].

3.3. Clinical presentation

Bigorexia nervosa was first described in 1993 by Pope and colleagues as a condition characterized by an intense preoccupation with physical appearance, especially body weight and muscularity, along with a strong drive to enhance it through strict dieting and excessive physical exercise [12]. The diagnostic criteria constituting the clinical presentation of this type of dysmorphia include excessive preoccupation with perceived physical flaws that are either minimal or unnoticeable to others. This is accompanied by recurrent body-checking behaviours, such as frequent mirror checking or persistent comparisons with others. The condition results in clinically significant distress or impairment in social, family, or occupational functioning. In addition, the symptoms are not better explained by the presence of an eating disorder. [7,23].

A notable aspect of this disorder is that affected individuals tend to perceive their own bodies as healthy, while simultaneously avoiding situations in which their physique could be exposed. They frequently refrain from social interactions and public settings due to concerns about not being sufficiently muscular [3].

Anabolic-androgenic steroid (AAS) use, along with its associated effects, is commonly observed in individuals with bigorexia Preliminary findings indicate that steroid use may differentiate men with BN from those without the condition [24]. Misuse of AAS, such as testosterone, is associated with serious health risks, including adverse lipid profiles, hypertension, and hyperlipidaemia, which increase cardiovascular disease risk. Importantly, resistance training does not appear to mitigate these negative cardiovascular effects in individuals who abuse these substances [25]. Other important adverse effects include prostate enlargement, acne, gynecomastia, and testicular atrophy. Abrupt discontinuation of anabolic steroid use may also lead to depressive symptoms [12].

3.4. Diagnostic Tools and Differential Diagnosis

Screening and early identification of BN can be challenging. Barriers include insecurities and limited knowledge about the disorder, both among affected individuals and professionals, which may hinder recognition and appropriate response to symptoms. Additionally, those experiencing symptoms are often reluctant to seek professional help, further contributing to underdiagnosis and delayed intervention [26].

Several validated screening tools are used to assess bigorexia. The Drive for Muscularity Scale (DMS) evaluates attitudes toward muscularity and motivation to increase muscle mass. The Male Body Check Questionnaire (MBCQ) measures body-checking behaviors, such as frequent appearance monitoring. The Muscle Dysmorphic Disorder Inventory (MDDI) assesses key dimensions of the disorder, including drive for size, appearance intolerance, and functional impairment. Another brief tool is Adonis Complex Questionnaire (ACQ). Most of these instruments have been validated primarily in male populations, and their use in women remains limited. Importantly, screening tools should be used as supportive measures and not as standalone diagnostic instruments, with clinical interviews remaining essential for accurate diagnosis [11].

The diagnosis of bigorexia or muscle dysmorphia requires careful differentiation from other disorders due to its complex and multifactorial classification. Core features such as rigid dietary practices, excessive exercise, and interpersonal difficulties overlap with those observed in

eating disorders, obsessive–compulsive spectrum disorders, and other psychiatric conditions, which complicates accurate diagnosis.

Patients with BN often do not display a general preoccupation with body image in the typical sense, but instead focus on perceived flaws in their physique that are often negligible or unnoticeable to others. Their behaviors are primarily directed toward increasing muscularity. Differential diagnosis includes anxiety disorders, psychotic disorders, major depressive disorder, behavioral addictions and eating disorders.

In bigorexia, fear of negative evaluation and embarrassment, unlike in social anxiety disorder, is largely driven by distorted body image and maladaptive beliefs about one's physique. Psychotic disorders, by comparison, are characterized by delusional beliefs about body weight or shape that are typically fixed and resistant to contradictory evidence, although severe forms of body dysmorphic disorder may also present with markedly reduced insight. Within major depressive disorder, negative perceptions of the body tend to be embedded in a broader and more complex constellation of depressive symptoms. Behavioral exercise addiction, on the other hand, is primarily motivated by the reinforcing rewards derived from physical activity itself, rather than a specific drive to increase muscularity [8,11].

Although eating disorders such as anorexia nervosa and bigorexia nervosa may both involve concerns about body composition, they differ in their primary goals: anorexia nervosa is characterized by restrictive behaviours aimed at reducing body weight, whereas muscle dysmorphia involves a drive to increase muscularity [27]. Despite these differences, both conditions share important psychological features, including dissatisfaction with body fat, excessive calorie counting, heightened focus on food, and anxiety about eating in social contexts [28]. In addition, body-checking behaviours are commonly observed in both disorders [29]. A typical feature is the co-occurrence of eating disorder symptoms and muscle dysmorphia. It is also observed that some individuals with anorexia nervosa may, during or after treatment, shift toward bigorexia, replacing weight-loss behaviours with a drive to gain muscularity while maintaining similar rigid body-focused cognitions [30]. This overlap not only complicates diagnosis and highlights the need for careful differential assessment, but also suggests shared underlying mechanisms that may contribute to the development of both conditions.

3.5. Treatment and prevention

Treatment of bigorexia nervosa is particularly challenging due to a combination of clinical, social, and biological factors. First, many affected individuals are reluctant to seek help, and

their behaviors (intense training and strict dieting) are often socially normalized, which leads to underdiagnosis and delayed intervention. Additionally, a major obstacle is the frequent use of anabolic steroids. Although discontinuation is essential for recovery, it can trigger significant psychological and physiological withdrawal symptoms, including depression, anxiety, hormonal imbalance, and even increased suicide risk. This makes patients hesitant to stop use and complicates treatment planning. Furthermore, individuals with BN often exhibit social withdrawal, shame, and impaired interpersonal functioning, which can hinder therapeutic engagement. Treatment is also undermined by exposure to "promuscularity" content online, which reinforces dysfunctional beliefs about body image and muscularity [24].

Treatment of BN is largely based on psychotherapy, with cognitive behavioral therapy (CBT) having the strongest evidence base [8,11]. CBT helps patients restructure obsessive thoughts related to body image and perfectionism, and its effectiveness in reducing BN symptoms has been supported by randomized controlled trials [31]. Other psychological approaches include dialectical behavioral therapy (DBT), which may support emotion regulation, although evidence for its effectiveness is still limited. Family therapy may be beneficial in adolescents with bigorexia, but current support is minimal and based mainly on individual case reports, meaning further research is needed to confirm its effectiveness [8,11]. There is evidence that dissonance-based (DB) interventions can reduce body dissatisfaction and bigorexia symptoms; however, findings regarding body-ideal internalization and eating disorder symptoms remain inconsistent [11].

An additional intervention in BN is nutrition therapy, which aims to reduce rigid eating patterns and restore a more flexible and balanced relationship with food by normalizing eating behavior and decreasing compulsive, appearance-driven dietary control. It begins with assessing dietary habits and developing a structured eating plan, followed by gradual exposure to previously avoided foods to reduce anxiety and improve dietary flexibility. The approach also includes psychoeducation to challenge nutrition myths and techniques that help patients reconnect eating with hunger, satiety, and enjoyment rather than training goals [7].

Pharmacotherapy is also an available treatment option for BN. First-line medication typically involves selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine, sertraline, escitalopram, fluvoxamine, and paroxetine, which can help reduce obsessive thoughts, body image preoccupation, and comorbid anxiety or depressive symptoms. In some cases, higher doses and longer treatment periods are needed to achieve clinical effects. Fluoxetine is considered particularly beneficial in reducing suicidality associated with body dysmorphic symptoms, while citalopram is generally avoided due to cardiac risks at higher doses. If

response to SSRIs is insufficient, treatment may be modified by switching antidepressants or using augmentation strategies, including buspirone, venlafaxine, clomipramine, or second-generation antipsychotics. Tricyclic antidepressants such as clomipramine are typically reserved for treatment-resistant cases. Overall, pharmacological treatment is usually long-term, requires careful monitoring, and is most effective when combined with psychotherapy [11].

Prevention of bigorexia emphasizes increasing awareness and knowledge, both in society and among health and fitness professionals. Improved awareness may support earlier identification of symptoms and help reduce stigma and shame associated with seeking psychological help, especially among men [26].

Preventive interventions are also proposed for adolescents, for example in the form of workshops. These typically combine educational components (e.g., lectures or psychoeducational videos) with group work, including discussions on how men and women are portrayed in traditional and social media, and activities promoting positive peer feedback. Importantly, such programs should be coeducational, as although BN more commonly affects boys and men, it can also occur in girls and women [7].

4. Conclusions

Bigorexia is a relatively newly recognized issue among physically active individuals, particularly athletes. Although it primarily affects men, its variable presentation in women and clinical heterogeneity suggest that its prevalence may be underestimated. Knowledge regarding its aetiology is still developing; however, both psychological factors and sociocultural influences are considered important, including the promotion of a highly muscular physique as an ideal body standard and the impact of media on the development of the disorder.

The classification of BN creates challenges, as it lies at the intersection of obsessive-compulsive spectrum disorders, body image disturbances, and eating disorders. Treatment and prevention also require further investigation, although current evidence suggests that psychotherapy, particularly cognitive-behavioural therapy, is the most promising approach.

BN may be viewed as an expression of pursuing a culturally promoted ideal of muscularity, which can lead to its trivialization. Nevertheless, its clinical consequences are significant. Of particular concern is that it affects young individuals. The co-occurring eating disorders and use of anabolic steroids may result in severe and sometimes irreversible health consequences. Additionally, the stigma surrounding mental health treatment among men remains an important barrier to seeking help.

Increasing knowledge among both healthcare professionals and the general public regarding this condition may support earlier detection, more effective management of the disorder and improve patients' self-awareness.

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Supplementary Materials

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