Anadolu Psikiyatri Dergisi || ISSN: 1302-6631 || Volume 26; Number 5
https://doi.org/10.5281/zenodo.17440932

Orthorexia Nervosa: A New Challenge in the Diagnosis and Treatment of Eating Disorders

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Abstract— Orthorexia nervosa (ON) is a proposed eating disorder characterized by a pathological preoccupation with consuming healthy and biologically pure foods, which may progress from socially encouraged dietary habits to rigid and restrictive behaviors. Despite increasing attention, ON remains absent from DSM-5 and ICD-11, and its classification as either an eating disorder or an obsessive-compulsive spectrum disorder is still debated. This review synthesizes evidence from 38 studies published between 2004 and 2024, identified through a systematic search of PubMed and Google Scholar, to summarize current knowledge on its risk factors, clinical features, diagnostic challenges, and treatment strategies. Findings indicate that ON prevalence varies widely, with elevated rates among healthcare professionals, athletes, and dietitians. Risk factors include perfectionism, obsessive-compulsive tendencies, psychopathology, and restrictive eating practices. Clinically, ON may lead to malnutrition, medical complications such as anemia, osteopenia, and metabolic acidosis, and significant psychosocial impairment. Diagnostic challenges stem from overlapping symptoms with anorexia nervosa and obsessive-compulsive disorder, as well as the limited validity of commonly used screening tools such as ORTO-15 and Bratman's Orthorexia Test. Current management emphasizes a multidisciplinary approach, combining cognitive-behavioral therapy, psychoeducation, nutritional counseling, mindfulness-based interventions, and, in severe cases, pharmacotherapy. These findings highlight ON as a clinically relevant but poorly defined condition, underscoring the urgent need for standardized diagnostic criteria, validated assessment instruments, and evidence-based treatment strategies to improve patient outcomes.

Keywords— *orthorexia nervosa; dietary restriction; eating disorders*

1. INTRODUCTION

Orthorexia nervosa (ON) is defined as an eating disorder (ED) characterized by an excessive preoccupation with consuming healthy foods and ensuring their biological purity, which can result in restrictive dietary patterns, ritualized eating behaviors, and a strict avoidance of foods perceived as unhealthy or impure [1]. Eating disorders (EDs) are serious mental health conditions that involve a disordered relationship with food and body image, often leading to profound physical and psychological harm [2]. Although research on ON has grown in recent years, there is still no universal agreement regarding its definition or specific diagnostic criteria. Despite several proposed frameworks, the suggested diagnostic guidelines vary across studies, and none have been officially included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) or the International Classification of Diseases (ICD-11), which makes diagnosing ON challenging and complicates its effective treatment [3]. It also remains unclear whether ON should be classified within the spectrum of eating disorders (EDs) or considered more

closely related to obsessive-compulsive disorder (OCD) [4]. Orthorexia is often described as progressing through two stages. The first stage is typically harmless and socially encouraged, involving the choice to pursue a healthy diet. However, this can escalate into the second stage, where the pursuit of healthy eating becomes an unhealthy obsession. It is in this pathological phase that obsessive thoughts, compulsive behaviors, self-punishment, and increasingly restrictive eating patterns emerge, resembling the psychological dynamics observed in traditional EDs [5]. The prevalence of orthorexic behaviors varies widely, ranging from 7% to 57% in the general population and from 29% to 34.9% in recent Italian studies conducted among university students. Even higher prevalence rates have been reported in specific high-risk groups, such as healthcare professionals, dietitians, athletes, yoga practitioners, performing artists, and customers of organic food stores. Moreover, the intense focus on dietary purity, self-imposed dietary restrictions, and selective eating commonly observed in individuals with ON may lead to serious health consequences, including nutritional deficiencies and medical complications such as anemia, pancytopenia, osteopenia, bradycardia, hyponatremia, and metabolic acidosis. These effects can closely mimic the patterns of malnutrition typically associated with anorexia nervosa (AN) [6]. Thus, early identification of individuals at risk and timely therapeutic intervention are essential to prevent the development of severe complications and to reduce the potential health risks linked to orthorexia [9].

This study seeks to summarize information on orthorexia nervosa, including its clinical features, health consequences, and diagnostic challenges. By analyzing recent research and case reports, the study aims to highlight the physical and psychological risks associated with orthorexic behaviors, underscore the need for early identification and intervention, and suggest directions for future research to improve diagnosis and treatment strategies.

2. MATERIALS AND METHODS

This review is based on the analysis of 38 studies selected through a systematic search of open-access databases, including PubMed and Google Scholar search engine, which served as a supplementary tool. The inclusion criteria focused on publications from 2004 to 2024 to ensure both the currency and comprehensiveness of the review. The incorporation of studies employing diverse methodologies and research designs enhances the reliability and generalizability of the review’s conclusions.

3. RESULTS

A. Risk factors

Orthorexia nervosa (ON) is a continuous preoccupation with following a personally chosen diet aimed at enhancing health [7]. Greater severity of ON has been found to correlate positively with perfectionism, obsessive-compulsive tendencies, psychopathology, disordered eating behaviors, a prior history of eating disorders, engagement in dieting, body dissatisfaction, and a heightened drive for thinness [8].

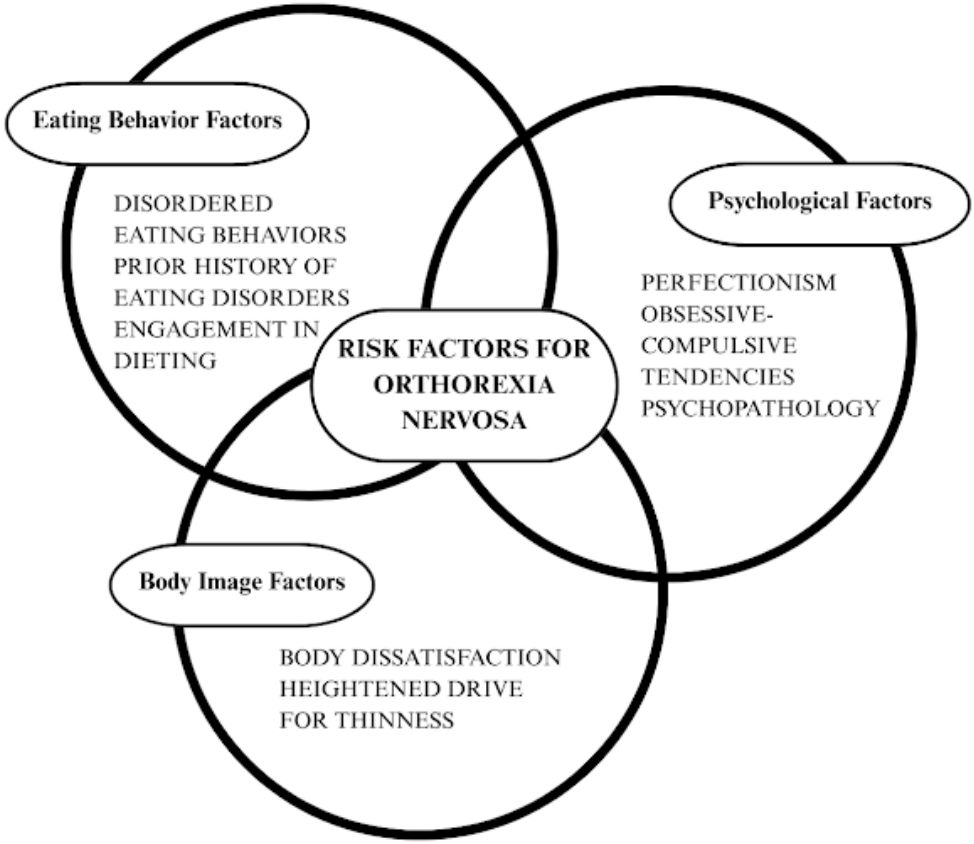

Figure 1. Risk factors for orthorexia nervosa

B. Obsessive-compulsive tendencies

Perfectionism, elevated levels of neuroticism, and a tendency toward obsessive-compulsive characteristics may increase the likelihood of individuals adopting strict and extreme dietary patterns. Psychologically, those who experience significant stress, anxiety, or dissatisfaction in other areas of their lives may resort to rigid eating habits and the illusion of dietary control as a coping mechanism or a way to regain a sense of control [9].

Research conducted by Oberle et al. (2017) and Hayles et al. (2017) demonstrated that higher overall perfectionism scores, as measured by the Frost Multidimensional Perfectionism Scale, were linked to stronger orthorexic tendencies among American college students [8].

OCD and ON share notable similarities, including cognitive rigidity, perfectionistic tendencies, and compulsions centered on healthy eating. However, while obsessions in OCD are typically perceived as ego-dystonic and cause considerable distress, obsessions in ON are generally perceived by individuals as rational and appropriate [10].

C. Psychopathology

Individuals with a current or prior history of various forms of psychopathology appear to be at an elevated risk for the development of Orthorexia Nervosa (ON). Empirical evidence suggests significant positive associations between ON and self-reported symptoms of depression, negative affective states, suicidal ideation (Barrada & Roncero, 2018; Gleaves et al., as cited in Oberle et al., 2017), anxiety

(Strahler et al., 2018), as well as body dysmorphic disorder (Bo et al., 2014; Bundros et al., 2016) [8].

Furthermore, research examining orthorexic tendencies indicates that women are statistically more likely than men to report pathological health-focused eating behaviors, although the observed effect size is relatively small [12].

D. Disordered eating behaviors

Various eating behaviors have been identified as potential risk factors for Orthorexia Nervosa (ON). Specifically, following a strict eating schedule and devoting substantial amounts of time to meal preparation have been positively associated with higher levels of ON (Missbach et al., 2015) [8]. In individuals with ON, the pursuit of a 'correct' or 'pure' diet often becomes obsessive, leading to a highly rigid, self-imposed dietary regimen that excludes certain foods or entire food groups perceived as unhealthy. As this preoccupation with healthy eating intensifies, individuals may experience adverse consequences, such as malnutrition, significant weight loss due to severely restricted dietary intake, and social isolation resulting from the avoidance of food-related social events [11].

Several studies have examined whether specific dietary patterns, such as vegetarianism or veganism, are linked to ON. For example, among Spanish yoga practitioners, vegetarians were more likely to exhibit orthorexic tendencies compared to non-vegetarians (Herranz Valera et al., 2014). Additionally, individuals engaged in alternative food networks - characterized by the preference for organic, locally grown, sustainably sourced, and artisanal foods - have been found to report higher levels of ON (Barnett et al., 2016).

Certain dietary preferences appear to be more prevalent among individuals with orthorexia nervosa. Adherence to the Mediterranean diet, which emphasizes the consumption of olive oil as the primary fat source, alongside high intake of vegetables, nuts, fish, and white meat instead of red meat, has been reported more frequently among those with ON compared to those without the condition (Strahler et al., 2018). Furthermore, individuals with ON tend to consume fewer saturated fats and animal-based fat products (Grammatikopoulou et al., 2018) [8].

Although tendencies toward health-conscious eating seem to be relatively comparable across genders, pathologically healthful eating behaviors are slightly more pronounced in women (Missbach et al., 2015) [12].

E. Diagnostic criteria

Orthorexia nervosa (ON) is not officially classified as a mental disorder and is currently absent from both the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the International Classification of Diseases (ICD-10) [9]. Although these classification systems provide diagnostic guidelines for eating disorders (EDs) and assist clinicians in their assessment and treatment, they do not offer specific criteria for ON [14].

The earliest diagnostic framework for ON appeared in a peer-reviewed publication alongside the case study by Moroze et al. (2015). Today, the Moroze et al. (2015) criteria remain widely referenced. These criteria acknowledge the obsessive-compulsive tendencies commonly associated with ON; however, they do not address the issue of weight loss within the disorder. Furthermore, a key limitation of these criteria is the inclusion of a particular dietary theory, rather than recognizing that individuals with ON may adhere to a variety of dietary philosophies, which can change over time.

The new diagnostic criteria for Orthorexia Nervosa (ON), as proposed by S. Bratman and T. Dunn, describe the disorder as an obsessive focus on healthy eating, based on personally constructed dietary beliefs that may vary between individuals. Criterion A highlights compulsive behaviors and persistent preoccupation with dietary practices believed to promote health [13]. Violations of these self-imposed

rules typically trigger intense emotional distress, including anxiety, guilt, and fear of illness, often accompanied by a sense of impurity or physical discomfort [38]. Over time, dietary restrictions usually intensify, leading to the elimination of entire food groups and the adoption of extreme cleansing or detoxification practices. Although weight loss may occur, it is secondary to the pursuit of dietary purity. Criterion B requires that these behaviors result in clinically significant consequences, such as malnutrition, medical complications, or notable psychological and social impairments. Individuals with ON often tie their self-esteem and identity closely to strict adherence to their dietary rules [13].

A key challenge in diagnosing orthorexia nervosa is distinguishing it from other eating disorders. While it shares features with anorexia nervosa, such as strict dietary restrictions, it typically lacks the intense fear of weight gain or distorted body image. Differentiating orthorexia from conditions like obsessive-compulsive disorder (OCD) and generalized anxiety disorder is also difficult due to similar health-related obsessions and compulsions [9].

F. Screening tools and assessment

Although the most commonly used tools for assessing orthorexia nervosa (ON) have been the ORTO-15 and the Bratman Orthorexia Test (BOT), other instruments such as the Düsseldorf Orthorexia Scale (DOS) and the Eating Habits Questionnaire (EHQ) have also been employed in some studies [15,16].

The BOT, developed by Bratman, was the first questionnaire designed to evaluate ON. It consists of 10 yes/no items that assess an individual's preoccupation with healthy eating, the impact of these behaviors on daily functioning, and the anxiety and guilt experienced when deviating from self-imposed dietary rules [9,15].

Among the available tools, the ORTO-15 has been the most widely used for assessing ON. This questionnaire comprises 15 multiple-choice items that address three key areas: cognitive-rational, clinical, and emotional aspects of orthorexic behavior [15]. The ORTO-15 was validated for the diagnosis of ON, confirming a three-factor structure and reporting a sensitivity of 100%, specificity of 73.6%, positive predictive value of 17.6%, and negative predictive value of 100% [17].

The EHQ conceptualizes ON as an "overwhelming preoccupation with eating healthfully." Following its validation process, the final version of the questionnaire was reduced to 21 items. It examines three main domains: knowledge about healthy eating, problems related to healthy eating, and positive feelings associated with healthy eating [15]. However, a notable limitation of the EHQ is its omission of items that capture the negative emotional experiences often reported by individuals with ON, such as sadness, fear, shame, guilt, frustration, self-loathing, and self-punishment when confronted with unhealthy food or when forced to deviate from their dietary rules [18].

The Düsseldorf Orthorexia Scale (DOS) is another instrument consisting of 10 items, each rated on a four-point Likert scale ranging from "does not apply to me" (1) to "applies to me" (4), yielding a total score between 10 and 40 [19]. Despite its utility, the DOS has been criticized for its limited ability to distinguish between orthorexic behaviors and those characteristic of anorexia nervosa (AN) in patients diagnosed with AN [15].

G. Multidisciplinary Treatment Approach

The optimal treatment strategy employs a multidisciplinary team comprising physicians, psychotherapists, and dietitians, enabling the integration of pharmacological interventions, cognitive-behavioral therapy, and psychoeducation, all under close supervision in an outpatient setting [20]. In cases where severe malnutrition arises as a consequence of excessive dietary restriction, inpatient hospitalization may be warranted [21].

H. Psychological and behavioural therapies

In recent years, orthorexia nervosa (ON) has received growing attention in clinical assessment and psychotherapy settings [20, 27]. Its treatment is typically multidisciplinary, integrating psychoeducation, cognitive-behavioral therapy (CBT), nutritional counseling, and mindfulness-based interventions [9]. A primary therapeutic goal is the normalization of eating behaviors alongside the identification and modification of psychological factors underlying disordered patterns. This comprehensive approach not only provides corrective support but also promotes reintegration into everyday life [28].

Psychoeducation plays a foundational role by helping individuals understand the psychological and health-related implications of ON. When grounded in evidence-based nutritional science, it effectively addresses distorted beliefs about food and health that often contribute to orthorexic behaviors [9, 20].

CBT focuses on restructuring maladaptive thought patterns and beliefs, aiming to foster long-term behavioral and emotional change [28]. In the context of ON, it promotes flexible, health-oriented eating habits, reduces anxiety around food and body image, and supports the gradual reintroduction of previously avoided foods [29, 30]. Techniques such as exposure and response prevention, combined with habit reversal training, have also shown promise in targeting obsessive-compulsive features of the disorder.

Tailoring treatment to individual symptom profiles is essential. Effective intervention must consider not only what individuals eat, but also how they shop, prepare food, and respond emotionally to eating experiences. Cognitive restructuring helps challenge rigid cognitive distortions, such as black-and-white thinking, catastrophizing, and perfectionism, commonly seen in ON. Relaxation techniques can reduce meal-related anxiety, while behavioral strategies support greater food variety, improved social engagement during meals, and diversification of non-food-related activities [20].

Nutritional counseling, led by clinicians experienced in eating disorders, helps address deficiencies caused by restrictive diets and encourages more balanced, inclusive eating patterns to restore physical health.

Mindfulness and acceptance-based therapies are also gaining traction. By cultivating non-judgmental awareness of thoughts and emotions, mindfulness helps individuals observe food-related anxiety without reactive behaviors. Acceptance-based strategies further support self-compassion and reduce the pursuit of dietary perfectionism, thereby fostering greater psychological resilience and a healthier relationship with food.

Finally, family and social support are critical in the recovery process. Family therapy enhances communication, addresses dysfunctional dynamics, and educates family members on how to support recovery. Social support from peers and groups provides additional emotional reinforcement and encouragement throughout the healing process [9].

I. Pharmacotherapy

Similar to other eating disorders, orthorexia nervosa (ON) poses significant treatment challenges [22]. These disorders represent complex and maladaptive patterns of behavior that can result in serious medical complications requiring immediate clinical attention [25]. Importantly, ON is not officially recognized as a separate diagnosis in the current edition of the DSM, and no standardized treatment guidelines have been developed for its management [23].

At present, scholarly literature on the treatment of ON is confined to a limited number of case studies, most of which involve patients suffering from extreme undernutrition and in need of initial medical stabilization. Therapeutic approaches described in these cases include hospital-based nutritional rehabilitation and symptomatic care for severe malnutrition (Park et al., 2011), as well as the administration of pharmacological agents such as mirtazapine, a tetracyclic antidepressant (Lopes, Melo,

& Pereira, 2018), and olanzapine, an atypical antipsychotic (Moroze, Dunn, Craig, Yager, & Weintraub, 2015). These medications are used off-label in the treatment of other restrictive eating disorders and are also applied in managing treatment-resistant obsessive-compulsive disorder (OCD) [26].

While the exact pharmacodynamics of olanzapine remain unclear, it is believed that its broad receptor activity - including effects on dopaminergic, serotonergic, muscarinic, histaminergic, and alpha-adrenergic systems - may contribute to reductions in anxiety and obsessive thought patterns, while also improving mood and appetite [22].

In a clinical case presented by Lopes et al. (2018), mirtazapine was used successfully to treat a young woman diagnosed with ON and co-occurring depression. Prior efforts, including dietary counseling and cognitive-behavioral therapy, did not lead to substantial progress. Mirtazapine, known for its noradrenergic and specific serotonergic effects, appeared to alleviate food-related anxiety and support appetite restoration. After 11 months of pharmacotherapy, the patient achieved remission of disordered eating behaviors, weight normalization, and resolution of depressive symptoms. These results suggest that mirtazapine may represent a potentially effective pharmacological intervention in complex ON cases [24].

Nonetheless, it is crucial to consider that individuals with orthorexia may be hesitant to accept pharmacological treatments, often perceiving medications as incompatible with their preference for “natural” substances [20].

J. Pathological Consequences

Proper nutrition and a balanced diet are crucial for maintaining both physical and mental health. While a healthy diet serves as a protective factor, an unhealthy one has been linked to an increased risk of anxiety and depression across all age groups. Nevertheless, an excessive preoccupation with eating only “clean” or “healthy” foods can develop into an unhealthy obsession, negatively impacting an individual's physical, psychological, and social well-being [31].

Individuals with such tendencies often derive a sense of moral superiority from their dietary restraint, praising themselves for resisting “unhealthy” foods and experiencing intense guilt or self-condemnation after even minor dietary lapses. Over time, their quality of life may deteriorate as they avoid social situations involving food, leading to social isolation, depression, and anxiety. In severe cases, extreme dietary restriction can result in malnutrition and, potentially, death [31, 35].

Case reports have documented the serious health risks associated with extreme orthorexic eating behaviors. These include severe underweight, malnutrition, and disturbances in cardiovascular and endocrine systems [22, 31]. For instance, Park et al. (2011) describe a patient who, in an attempt to treat his tic disorder, consumed only 3-4 spoonfuls of brown rice and fresh vegetables without salt for three months. This led to hyponatremia, metabolic acidosis, subcutaneous and mediastinal emphysema, pneumothorax, and pancytopenia [32, 34]. Similarly, a case reported by Nauta, Toxopeus, and Eekhoff (2016) involved a 71-year-old man who, despite not meeting DSM criteria for an eating disorder, followed a highly restrictive diet consisting solely of vegetables, oil, and water. This led to heart failure, cachexia, biochemical imbalances, and gastrointestinal complications [32].

One particularly dangerous complication arising from severe malnutrition is refeeding syndrome (RFS), a life-threatening condition that can occur when nutritional support is reintroduced too quickly following prolonged starvation [33, 34]. RFS is characterized by critical shifts in fluids and electrolytes, with hypophosphatemia being the key biochemical indicator. It also involves imbalances in sodium, glucose, and fluid levels, as well as deficiencies in potassium, magnesium, and thiamine. These changes can severely impact neurological, cardiac, pulmonary, hematologic, and neuromuscular function [34].

Future research should focus on clinical case studies and interviews with undernourished individuals to better understand the lifestyle factors associated with orthorexic behaviors, thereby

expanding the current knowledge base on orthorexia nervosa (ON) [32].

4. DISCUSSION

As noted by Cena et al., despite growing awareness of orthorexia nervosa (ON), standardized diagnostic criteria are still lacking, and widely used assessment tools such as ORTO-15 and Bratman's test display notable psychometric limitations [16]. Case studies, such as the one presented by Moroze et al., demonstrate how an excessive focus on micronutrient intake can escalate into near-fatal ON, highlighting the urgent need for clearer diagnostic frameworks [22]. Recent systematic and meta-analytic reviews have highlighted substantial methodological issues. Huynh et al. report that older assessment tools tend to underestimate obsessive-compulsive traits, whereas more recent instruments demonstrate a stronger association between ON and obsessive-compulsive symptomatology [36].

Although ON shares characteristics with anorexia nervosa - particularly dietary restraint - it differs from disorders such as bulimia nervosa or binge eating disorder in its limited emphasis on body image concerns. This distinction supports the view that ON may represent a separate clinical entity [3]. Estimates of ON prevalence vary widely, with meta-analyses reporting rates of 27-30% based on ORTO-15 cut-offs, and higher figures among athletes and fitness-focused individuals. These numbers are likely inflated due to flawed measurement and inconsistent thresholds [37]. Earlier tools also failed to capture obsessive-compulsive aspects of ON, limiting insight into its underlying psychopathology - a gap more effectively addressed by newer assessments developed since 2018 [36].

In sum, current evidence supports ON as a clinically relevant and potentially distinct eating disorder, driven by perfectionism, rigid beliefs about food purity, and marked psychological distress. However, progress in the field is constrained by definitional inconsistencies, limited intervention research, and the use of psychometrically weak assessment tools. Moving forward, the development of consensus-based diagnostic criteria and the validation of robust measurement instruments are urgently needed to improve prevalence estimates, facilitate longitudinal and treatment research, and deepen our understanding of ON's etiology and clinical trajectory [9].

5. CONCLUSIONS

Orthorexia nervosa (ON) is a complex and emerging condition marked by an unhealthy obsession with healthy eating. Orthorexic behaviors, though initially health-driven, may lead to malnutrition, social isolation, and reduced quality of life. Diagnostic challenges persist due to symptom overlap with other disorders and the lack of standardized criteria. Existing screening tools, while useful, vary in validity and scope. Effective treatment involves a multidisciplinary approach, with cognitive-behavioral therapy, psychoeducation, nutritional counseling, and mindfulness-based strategies forming the therapeutic core. Pharmacotherapy may be beneficial in severe or treatment-resistant cases, though patient acceptance can be limited. Given its potential for serious medical and psychosocial consequences, early identification and intervention are critical. Future research should focus on refining diagnostic criteria, validating assessment tools, and developing evidence-based treatment protocols. Increased awareness is also essential to distinguish ON from culturally accepted health practices and prevent its normalization.

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