International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

Dolna 17, Warsaw,
Poland 00-773
+48 226 0 227 03
editorial_office@rsglobal.pl

ARTICLE TITLE	SOMATIC CONSEQUENCES OF ANOREXIA NERVOSA: AN UPDATED REVIEW
DOI	https://doi.org/10.31435/ijitss.3(47).2025.3811
RECEIVED	26 July 2025
ACCEPTED	28 September 2025
PUBLISHED	30 September 2025
LICENSE	The article is licensed under a **Creative Commons Attribution 4.0 International License.**

© The author(s) 2025.
This article is published as open access under the Creative Commons Attribution 4.0 International License (CC BY 4.0), allowing the author to retain copyright. The CC BY 4.0 License permits the content to be copied, adapted, displayed, distributed, republished, or reused for any purpose, including adaptation and commercial use, as long as proper attribution is provided.

SOMATIC CONSEQUENCES OF ANOREXIA NERVOSA: AN UPDATED REVIEW

Martyna Grodzińska *(Corresponding Author, Email: martyna.grodzinska@gmail.com)*
MD, Lower Silesian Oncology, Pulmonology and Hematology Center, Wrocław, Poland
ORCID ID: 0009-0004-1001-6484

Piotr Sobkiewicz
MD, Lower Silesian Oncology, Pulmonology and Hematology Center, Wrocław, Poland
ORCID ID: 0009-0007-6610-440X

Karol Poplicha
MD, State Medical Institute of the Ministry of the Interior and Administration, Warsaw, Poland
ORCID ID: 0009-0005-3835-9777

Maria Ufniarska
MD, Saint Adalbert Hospital in Gdańsk, Gdańsk, Poland
ORCID ID: 0009-0008-5927-4811

Aleksandra Piech
MD, Clinical Provincial Hospital No. 2 them. Saint Jadwiga the Queen in Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0001-4485-2200

Tomasz Ufniarski
MD, University Clinical Center in Gdańsk, Gdańsk, Poland
ORCID ID: 0009-0008-6555-3403

Justyna Moszkowicz
MD, Clinical Provincial Hospital No. 2 in Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0009-2582-6187

Karolina Pasierb
MD, The University Hospital in Krakow, Kraków, Poland
ORCID ID: 0009-0006-5806-3508

Patrycja Kardasz
MD, Saint Adalbert Hospital in Gdańsk, Gdańsk, Poland
ORCID ID: 0009-0006-8137-9789

Bartłomiej Siuzdak
MD, Clinical Provincial Hospital No. 2 in Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0003-8691-6617

Marta Jutrzenka
MD, Praga Hospital of the Transfiguration, Warsaw, Poland
ORCID ID: 0000-0001-7266-1586

Patrycja Ucikalak
MD, District Hospital in Zawiercie, Zawiercie, Poland
ORCID ID: 0009-0002-3681-1051

Jarosław Ucieklak
MD, District Hospital in Zawiercie, Zawiercie, Poland
ORCID ID: 0009-0002-2702-4953

ABSTRACT

Anorexia nervosa is a group of symptoms based on conscious restriction of food intake. Anorexia disrupts the body's homeostasis, so that the functioning of many organs is impaired. These dysfunctions involve the neuroendocrine system, the cardiovascular system, the skeletal system, the digestive system, and the reproductive system. Knowing the symptoms makes it possible to make an accurate diagnosis at an early stage of the disease. This is especially important given the increasing incidence and mortality rates. This article reviews the main clinical manifestations of AN. Attention is given to both pharmacotherapies and psychotherapy.

The aim of the study: The purpose of this paper is to summarize the existing knowledge on mental anorexia nervosa. The article presents etiology, epidemiology, diagnosis, differentiation, clinical picture and treatment. The topic of eating disorders in pregnant women is also described.

Material and method: In our article we used English databases such as PubMed and Google Scholar. We selected the articles according to key words such as eating disorders, osteoporosis, cardiomyopathy, hypoglycemia, psychotherapy, medical assessment, treatment.

Conclusions: Eating disorders are a topic that unites many medical disciplines. The array of symptoms accompanying the disease clearly demonstrates the correlation of mental health with somatic health. Negative effects affect the skeletal system, neuroendocrine system, cardiovascular system, gastrointestinal system and reproductive system. Treatment is based on the use of pharmacotherapy, mainly using SSRI group drugs, as well as psychotherapy. A particularly appreciated current, among specialists, is cognitive-behavioral therapy.

KEYWORDS

Eating Disorders, Osteoporosis, Cardiomyopathy, Hypoglycemia, Psychotherapy, Medical Assessment, Treatment

CITATION

Martyna Grodzińska, Piotr Sobkiewicz, Karol Poplicha, Maria Ufniarska, Aleksandra Piech, Tomasz Ufniarski, Justyna Moszkowicz, Karolina Pasierb, Patrycja Kardasz, Bartłomiej Siuzdak, Marta Jutrzenka, Patrycja Ucikalak, Jarosław Ucieklak. (2025) Somatic Consequences of Anorexia Nervosa: An Updated Review. *International Journal of Innovative Technologies in Social Science,* 3(47). doi: 10.31435/ijitss.3(47).2025.3811

COPYRIGHT

© The author(s) 2025. This article is published as open access under the **Creative Commons Attribution 4.0 International License (CC BY 4.0)**, allowing the author to retain copyright. The CC BY 4.0 License permits the content to be copied, adapted, displayed, distributed, republished, or reused for any purpose, including adaptation and commercial use, as long as proper attribution is provided.

Introduction

Anorexia nervosa (AN) is one of the conditions in the eating disorder group. The disease mainly affects young women and adolescent girls entering puberty. The peak incidence is between the ages of 12 and 18. As many as 70% of women admit to having used weight-loss diets in the past or staying on a diet. Women face the disease more than ten times more often than men. [1]AN is a syndrome of symptoms, with a fully unknown etiology. The disease is characterized by a disturbed self-image, ambivalence, increased self-control, self-injury, and starvation. Patients do not accept their body image, follow restrictive diets, and institute strict dietary rules. Restrictiveness is equated with a desire for control. Control provides a sense of satisfaction and security. Such behaviors lead to cachexia. Many metabolic, hormonal pathways are subject to destruction. It is not uncommon to experience secondary menstrual cessation, which leads to many complications, including infertility. Hypoestrogenism, hypoandrogenism and hypercortisolemia are common endocrine disorders. All these somatic dysfunctions make AN the disease with the highest mortality rate among mental illnesses.

Patients entering treatment opt for a combination of drug therapy and psychiatric therapy. Empirical data indicate that duality in therapy is better prognostically. [2]

Methodology

This narrative review synthesizes current evidence on the somatic complications of anorexia nervosa (AN), with particular emphasis on its effects on the neuroendocrine, cardiovascular, skeletal, gastrointestinal, and reproductive systems. The review was conducted in accordance with the PRISMA 2020 guidelines. A structured literature search was performed in PubMed and Google Scholar databases, covering mainly the years 2020–2025, using combinations of terms such as *“anorexia nervosa,” “eating disorders,”*

"osteoporosis," "cardiomyopathy," "hypoglycemia," "pregorexia," "refeeding syndrome," "psychotherapy," and *"treatment."* Boolean operators and search syntax were adapted to each database.

Eligibility criteria were restricted to peer-reviewed, full-text articles published in English. Priority was given to systematic reviews, meta-analyses, randomized controlled trials (RCTs), and large observational studies. Additional relevant publications were identified through reference and citation tracking.

Studies were selected based on relevance, methodological quality, and contribution to the thematic scope of this review. Data were manually extracted and categorized into domains reflecting the main somatic consequences of AN, including skeletal health, endocrine dysfunction, cardiovascular complications, gastrointestinal impairment, reproductive outcomes, and treatment-related risks such as refeeding syndrome. Emphasis was placed on clinical outcomes, pathophysiological mechanisms, and therapeutic implications.

Results

Research on the etiology and pathogenesis of AN is still ongoing. Scientists advocate the multi-causal nature of etiopathogenesis. Genetic, biological, psychological, familial, as well as socio-cultural factors are interrelated. [3] One hypothesis points to correlations of AN with central nervous system damage in the last trimester of pregnancy or in the perinatal period. Genetic conditions, psychosocial qualities are important. The anankastic personality type predisposes to AN. [4]. Exorbitant ambition, perfectionism, accompanied by a sense of lack of control over actions taken are triggers. Seeing oneself in the shadow of others, as well as the fear of making a mistake, intensifies the state of helplessness. [4,5]

The risk of developing the disease increases up to 10-fold when there is AN among first-degree relatives. [5] People with mental illnesses such as depression, anxiety and substance abuse are also at increased risk. A number of factors can both predispose, exacerbate, and worsen the prognosis.

These factors include: BMI less than 70% of the due value for the relevant age group, loss of 1 kg per week in the past two consecutive weeks, heart rate less than 40 beats per minute, abnormal rhythm, ECG deviations, severe dehydration, body temperature less than 35.5 degrees Celsius, refusal to take meals, caloric intake less than or within the range of 400-600 kcal per day, domestic violence, low electrolyte levels, use of highly intense exercise, suicidal thoughts, thoughts of resignation, delirium, impaired consciousness, acute pancreatitis, impaired gastrointestinal motility, gastric ulcers. [6]

Diagnosis

The doctor making the diagnosis is required to, take a history with the patient or his legal guardians, conduct a physical examination and review a set of documents describing the patient's past medical history. A psychological consultation is also an indispensable part of the examination. Doctors of psychiatry, psychologists, and nutritionists should work together. A holistic approach to the patient yields better treatment outcomes and is associated with a lower rate of patient hospitalization. [8,9,10]

The history should include:

1. current symptoms, weight and height (BMI assessment)
2. past medical history
3. relationship with the family
4. assess contact with the patient (allo/auto mental)
5. additional criteria [7].

Due to the varied and sparse nature of the symptoms, the first worrisome signs often go unnoticed. Patients do not remain critical of their own emaciated figure. They lack insight into their own disease. Diagnosing AN is a challenge for specialists. In each case, other possible causes of reduced food intake or weight loss must be considered. Differential conditions include cancer, autoimmune diseases, neurological diseases, or genetic diseases. [8]

The criteria for diagnosis are shown in Table 1. They are based on the criteria of the International Statistical Classification of Diseases and Health Problems (ICD-10), as well as those of the American Psychiatric Association (DSM-5).

Table 1. Criteria for the diagnosis of mental anorexia [6,31-33].

ICD-10 criteria	DSM-5 criteria
Weight reduction leading to a weight 15% below normal or expected for age, or a BMI of less than 17.5	Reducing the energy supply of meals leading to significantly reduced body weight
Weight-loss behaviors: avoiding fattening food, provoking vomiting, laxation, exhaustive exercise, use of appetite suppressants or diuretics	Intense fear of weight gain or obesity, or persistent behaviors that prevent weight gain
Fear of weight gain and disturbed body image	Disturbed experience of weight or body shape, excessive impact of weight on self-esteem, or persistent unawareness of the significance of current underweight
Hormonal disorders manifested by absence of menstruation	
Disorders that do not meet the criteria for a diagnosis of bulimia nervosa	

Clinical picture and course

The clinical picture of AN is characterized by a variety of symptoms. Often the first symptoms are nonspecific. Patients report headaches, feelings of fatigue, sluggishness, difficulty healing wounds. [9]

Patients have a distorted view of their bodies, so they often deny the disease. Patients misjudge reality and think they are acting in accordance with society's expectations. This makes it difficult to diagnose mental anorexia at an early stage.

The course of the disease depends, among other things, on patients' motivation. Awareness of one's own illness is prognostically favorable. [10] In the course of AN, periods of remission occur. Unfortunately, despite this, many patients die. This is due to years of cachexia.

During the course of the disease, the digestive system, the neuroendocrine system, the reproductive system, the skeletal system, and the cardiovascular system, among others, are impaired. [11]

Gastrointestinal tract- slowed intestinal passage

The predominant symptoms from the gastrointestinal tract are constipation, bloating, nausea, abdominal pain, a feeling of fullness in the abdominal cavity, heartburn, vomiting, epigastric pain, decreased appetite, diarrhea or swallowing disorders. Erosion of the mucosa along the entire length of the digestive tract appears. This is caused by a change in the pH in the lumen of the duct to acidic. Then the risk of perforation of the esophagus, stomach wall or duodenum increases, posing an immediate threat to life.

Studies show that patients with AN also have impaired gastrointestinal motility. Diagnoses include slowed esophageal motility, achalasia, gastroesophageal reflux, diffuse esophageal spasm, and slowed gastric emptying. The intestinal passage due to frequent use of laxatives also remains slowed. [34,35]

Neuroendocrine system - menstrual disorders

The menstrual cycle is a basic exponent of women's health. Any deviation from the norm, such as lack of menstrual bleeding or menstrual periods that are too scanty, should be thoroughly discussed when visiting a gynecologist. Neglecting the deregulation of the menstrual cycle is associated with long-term complications and even infertility.

Menstrual disorders are a common symptom of anorexia nervosa. The pathophysiology is strongly linked to the neuroendocrine system. With malnutrition, the downstream trunk of the hypothalamic-pituitary-ovarian axis ceases to function properly. Secondary dysfunction of the hypothalamus is the cause of the absence of menstruation. As a result of impaired pulsatile secretion of GnRH (gonadotropin-releasing hormone), there is a decrease in the secretion of the tropic hormones LH and FSH by the pituitary. As a result, estrogen synthesis by the ovaries is reduced, which inhibits ovulation.

Energy deficiencies condition lower levels of leptin and insulin-like growth factor 1. This condition disrupts the pulsation of luteinizing hormone, and this adversely affects gonadal function. [12] ,[13]

Reproductive system - pregorexia

The female body undergoes many changes during pregnancy. The growing fetus requires an increase in energy resources. A woman's body becomes plumper, the amount of body fat increases, water accumulates, and weight gain occurs. Such changes can have adverse effects on a woman's mental health. They can be trigger factors in the development of pregorexia (pregnancy + anorexia). In addition, women suffering from pregorexia are more likely to develop postpartum depression.

A woman's nutritional status during pregnancy is one of the most important factors affecting fetal well-being. Adequate nutrition also benefits lactation after delivery. Caloric requirements vary from trimester to trimester.

The fetus is the most severely affected. Low maternal weight contributes to micronutrient deficiencies. Neural tube defects, cognitive abnormalities, premature pore, respiratory failure, feeding difficulties and even miscarriages are common complications. The symptoms of pregorexia are very similar to those of AN. The mother's body is at risk of dehydration, malnutrition, bone mineralization disorders, anemia, gestational diabetes. The risk of placental detachment increases, with the risk of hemorrhage and even death for mother and baby. [14],[15]

Skeletal system - osteoprosis

Osteoporosis is a severe complication of AN. More than half of young women suffering from AN struggle with osteoporosis. It happens relatively quickly, and results in reduced bone mineral density below the critical fracture threshold. In female patients with AN, the degree of bone tissue resorption increases. Along with this, the concentration of resorption markers increases: N- teleopeptide and deoxypyridoline, while there is no increase in bone formation markers such as osteocalcin. Bone loss is rapid and occurs at a relatively early stage of the disease. Some work suggests that osteoporotic changes occur as early as 12 months, after weight loss below age-matched values. By the age of 11- 14, women gain 40% to 60% of their bone mass, which correlates with puberty. This is the time of peak incidence of AN. Therefore, optimizing bone mineral density during this period is very important. [16]

Main features of refeeding syndrome

Refeeding syndrome (RS) otherwise known as food shock syndrome encounters patients when the patient, after a long period of starvation, begins to consume excessive amounts of food, particularly through the oral route. The first indications were described among concentration camp victims after the end of World War II.

RS affects patients suffering not only from eating disorders of the restrictive type, but also those with cancer, malabsorption disorders.[17] As a result of the rapid supply of excessive amounts of food, water and electrolyte imbalances occur. Laboratory tests show reduced phosphorus levels, hypokalemia, hyponatremia, as well as fluid retention, vitamin deficiencies and metabolic acidosis. [18]

Cardiovascular System

In recent years, there have been many review papers detailing the cardiovascular changes in AN. Cardiovascular factors are highly lethal complications. Patients present with the following abnormalities: orthostatic hypotension, systolic blood pressure below 100mmHg, sinus bradycardia. Sinus bradycardia is the most common arrhythmia in AN. The intensity of bradycardia depends on the duration of the disease and underweight. Tachycardia can also occur secondary to anemia, infection or other acute conditions. [19]

Another significant complication is myocardial atrophy resulting from extreme cachexia. Myocardial atrophy, particularly left ventricular atrophy, is observed. Mitral valve leaflet prolapse is noted in up to 2/3 of patients. These changes adversely affect myocardial contractility, thus causing a decrease in ejection fraction. Patients complain of decreased exercise tolerance and constant fatigue. [20],[21]

Treatment

A key prerequisite for successful therapy is strong patient involvement. Insight into one's own disease speeds up the therapeutic process. Awareness of the severity of complications adds motivation to patients. Unfortunately, a small percentage of patients, especially at the beginning of therapy, are able to meet these requirements. Meeting therapeutic requirements is more difficult for patients in their teenage years. Then the involvement of the patient's family is important.[22]

The first line of treatment should be outpatient therapy. The exception to the rule is when the body is cachexia and hospitalization in a somatic ward is undertaken, when a life-threatening factor is involved. Absolute indications for hospitalization are a BMI value of less than 12, bradycardia of less than 60 beats per

minute or other serious cardiac arrhythmias, electrolyte disturbances, blood sugar levels of less than 60 mg%, decreased body temperature of less than 36.5 degrees Celsius and blood pressure of less than 90/60 mmHg. In contrast, BMI values below 15 are relative indications. When hospitalization of children is undertaken, family support is important. It is recommended that parents actively participate in psychotherapy, reintegration activities. [20] [23] It is believed that a multimodal approach with an interdisciplinary team experienced in treating AN is the treatment of choice. Psychiatrists, psychologists, dieticians, physiotherapists and experienced nurses make up the group of specialists who participate in therapy. [24]

The diet plan should consist of six meals, three main meals and three smaller meals. For patients who are unable to eat, meals should be administered in liquid form so as to balance the appropriate caloric supply given the distribution of macro and micronutrients. In extreme cases, hospitalized patients are fed via nasogastric tube. [25]

Achieving adequate body weight is only one component of recovery. The therapeutic goal is based on several pillars: normalization of body weight (according to the need calculated on the basis of the BMI index), getting rid of obsessive thoughts on the broad topic of nutrition and one's own appearance, absence of compulsions, return of regular monthly cycles in the case of women, achieving hormonal balance, restoration of normal body temperature, compensation for dehydration. [26]

At first, re-feeding is often fraught with complications in the form of constipation, bloating, impaired gastric emptying. Then appropriate prokinetic or osmotic agents are added to the basic therapy. During hospitalization, it is worth paying attention to physical as well as psychological well-being. A home-like environment should be provided for patients. [27]

Cognitive-behavioral psychotherapy is an important element in therapy, especially when patients suffer from obsessive-compulsive disorders. The patient should adjust his expectations to the choice of psychotherapeutic stream, not always the patient himself makes the decision. In the case of a minor, the parent sends the child to a therapy group or to individual classes. It is recommended that sessions take place at least once a week. The duration of therapy is adjusted according to the patient's needs and commitment. In the case of teenage patients, family therapies yield positive results. It is important that parents also actively participate in the sessions. [28]

Psychiatric treatment is an important element in the treatment of eating disorders. Tricyclic antidepressants should not be used in the acute phase of eating disorder because they can lead to dangerous arrhythmias. This requires a multidisciplinary approach by multiple specialists, including psychiatrists, internists, cardiologists or pediatric cardiologists in the case of pediatric patients. A safe, commonly used alternative are drugs from the serotonin reuptake inhibitor group, such as fluoxetine, sertraline, escitalopram, citalopram, paroxetine and fluvoxamine. Their action is to prevent the transport of serotonin back into the nerve cell, so that its concentration in the brain increases. For increased obsessive-compulsive symptoms, anxiety or psychotic symptoms, olanzapine can be used. Olanzapine blocks the serotonin 5-HT2A receptor more potently than the dopamine D2 receptor. [29]

It is estimated that in half of the women, menstruation returns spontaneously once normal weight is achieved. In the rest, supportive treatment is needed to restore a regular menstrual cycle. It is recommended to administer GnRH hormones in a pulsatile manner or use low doses of its analogs. This is particularly beneficial for women with maternity plans who have not yet ovulated. [30]

Conclusions

The incidence of AN is reported to be high, and the mortality rate among patients with eating disorders is much higher compared to other psychiatric conditions. In recent years, mental anorexia nervosa has become a multidisciplinary problem, bringing together a number of specialists.

Mental anorexia nervosa disrupts the functioning of many systems, including the endocrine, cardiovascular, nervous, respiratory or reproductive systems. Low bone mineral density is one of the most common and serious complications. Osteoporosis affects more than half of anorexia patients. Zlamaani The complexity of the problem of bone demineralization is related to insufficient caloric supply, which translates into disorders of the hypothalamic-pituitary axis.

Pregorexia negatively affects both the patient's body and the fetus. It is a particularly difficult case because of the difficulty of drug treatment. Many drugs are contraindicated during pregnancy. The duality of the problem translates into treatment. Both psychotherapy and pharmacotherapy are important.

Special care should be given to pediatric patients. It is important that their family actively participate in group therapy.

Author's contribution:
The authors confirm contribution to the paper as follows:
Conceptualization: Martyna Grodzińska
Methodology: Martyna Grodzińska, Piotr Sobkiewicz, Karol Poplicha , Aleksandra Piech
Software: Martyna Grodzińska and Marta Jutrzenka
Check: Martyna Grodzińska, Maria Ufniarska, Justyna Moszkowicz
Formal analysis: Martyna Grodzińska and Aleksandra Piech
Investigation: Tomasz Ufniarski and Martyna Grodzińska
Resources: Martyna Grodzińska
Data curation: Maria Ufniarska, Aleksandra Piech, Martyna Grodzińska and Piotr Sobkiewicz, Jarosław Ucieklak
Writing - rough preparation: Bartłomiej Siuzdak, Karol Poplicha, Maria Ufniarska
Writing - review and editing: Aleksandra Piech, Patrycja Kardasz, Karolina Pasierb, Patrycja Ucieklak
Visualization: Marta Jutrzenka
Supervision: Martyna Grodzińska
Project administration: Piotr Sobkiewicz
All authors have read and agreed with the published version of the manuscript.

Funding Statement: This research received no external funding.
Institutional Review Board Statement: Not applicable.
Informed Consent Statement: Not applicable.
Data Availability Statement: Not applicable.
Acknowledgements: Not applicable.
Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict to interest.

REFERENCES

1. Skowron, K., Kurnik-Łucka, M., Dadański, E., Bętkowska-Korpała, B., & Gil, K. (2020). Backstage of eating disorder—About the biological mechanisms behind the symptoms of anorexia nervosa. *Nutrients, 12*(9), 2604. https://doi.org/10.3390/nu12092604
2. Støving, R. K. (2019). Mechanisms in endocrinology: Anorexia nervosa and endocrinology: A clinical update. *European Journal of Endocrinology, 180*(1), R9–R27. https://doi.org/10.1530/EJE-18-0596
3. Grayeb, D. E., Chan, E. D., Swanson, L. M., Gibson, D. G., & Mehler, P. S. (2021). Nontuberculous mycobacterial lung infections in patients with eating disorders: Plausible mechanistic links in a case series. *AME Case Reports, 5*, 9. https://doi.org/10.21037/acr-20-101
4. Batista, M., Žigić Antić, L., Žaja, O., Jakovina, T., & Begovac, I. (2018). Predictors of eating disorder risk in anorexia nervosa adolescents. *Acta Clinica Croatica, 57*(3), 399–410. https://doi.org/10.20471/acc.2018.57.03.01
5. Skowron, K., Kurnik-Łucka, M., Dadański, E., Bętkowska-Korpała, B., & Gil, K. (2020). Backstage of eating disorder—About the biological mechanisms behind the symptoms of anorexia nervosa. *Nutrients, 12*(9), 2604. https://doi.org/10.3390/nu12092604
6. Anton-Păduraru, D. T., Trofin, F., Năstase, E. V., Miftode, R. S., Miftode, I. L., Trandafirescu, M. F., Cojocaru, E., Țarcă, E., Mindru, D. E., & Dorneanu, O. S. (2023). The role of the gut microbiota in anorexia nervosa in children and adults—Systematic review. *International Journal of Molecular Sciences, 25*(1), 41. https://doi.org/10.3390/ijms25010041
7. Grinspoon, S., Thomas, E., Pitts, S, Gross, E., Mickley, D., Miller, K., Herzog, D., & Klibanski, A. (2000). Prevalence and predictive factors for regional osteopenia in women with anorexia nervosa. *Annals of Internal Medicine, 133*(10), 790–794. https://doi.org/10.7326/0003-4819-133-10-200011210-00011
8. Neale, J., & Hudson, L. D. (2020). Anorexia nervosa in adolescents. *British Journal of Hospital Medicine (London), 81*(6), 1–8. https://doi.org/10.12968/hmed.2020.0099
9. Støving, R. K., Hangaard, J., Hansen-Nord, M., & Hagen, C. (1999). A review of endocrine changes in anorexia nervosa. *Journal of Psychiatric Research, 33*(2), 139–152. https://doi.org/10.1016/S0022-3956(98)00049-1
10. Dobrescu, S. R., Dinkler, L., Gillberg, C., Råstam, M., Gillberg, C., & Wentz, E. (2020). Anorexia nervosa: 30-year outcome. *The British Journal of Psychiatry, 216*(2), 97–104. https://doi.org/10.1192/bjp.2019.113
11. Arcelus, J., Mitchell, A. J., Wales, J., & Nielsen, S. (2011). Mortality rates in patients with anorexia nervosa and other eating disorders: A meta-analysis of 36 studies. *Archives of General Psychiatry, 68*(7), 724–731. https://doi.org/10.1001/archgenpsychiatry.2011.74

12. Atroszko, P. A., Mytlewska, W. M., & Atroszko, B. (2020). The majority of professionally active women diagnosed with eating disorders may be at risk of work addiction: An overlooked comorbidity. *Health Psychology Report, 9*(4), 308–337. https://doi.org/10.5114/hpr.2020.98734
13. Kaye, W. H., Bulik, C. M., Thornton, L., Barbarich, N., & Masters, K. (2004). Comorbidity of anxiety disorders with anorexia and bulimia nervosa. *American Journal of Psychiatry, 161*(12), 2215–2221. https://doi.org/10.1176/appi.ajp.161.12.2215
14. Hudson, J. I., Hiripi, E., Pope, H. G., Jr., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry, 61*(3), 348–358. https://doi.org/10.1016/j.biopsych.2006.03.040
15. Witkoś, J., & Wróbel, P. (2019). Menstrual disorders in amateur dancers. *BMC Women's Health, 19*, 87. https://doi.org/10.1186/s12905-019-0779-1
16. Teng, K. (2011). Premenopausal osteoporosis: An overlooked consequence of anorexia nervosa. *Cleveland Clinic Journal of Medicine, 78*(1), 50–58. https://doi.org/10.3949/ccjm.78a.10023
17. Fuglset, T. S. (2019). Set-shifting, central coherence and decision-making in individuals recovered from anorexia nervosa: A systematic review. *Journal of Eating Disorders, 7*, 22. https://doi.org/10.1186/s40337-019-0251-5
18. Skowrońska, A., Sójta, K., & Strzelecki, D. (2019). Refeeding syndrome as treatment complication of anorexia nervosa. *Psychiatria Polska, 53*(5), 1113–1123. https://doi.org/10.12740/PP/OnlineFirst/90275
19. da Silva, J. S. V., Seres, D. S., Sabino, K., Adams, S. C., Berdahl, G. J., Citty, S. W., Cober, M. P., Evans, D. C., Greaves, J. R., Gura, K. M., Michalski, A., Plogsted, S., Sacks, G. S., Tucker, A. M., Worthington, P., Walker, R. N., & Ayers, P.; Parenteral Nutrition Safety and Clinical Practice Committees, American Society for Parenteral and Enteral Nutrition. (2020). ASPEN consensus recommendations for refeeding syndrome. *Nutrition in Clinical Practice, 35*(2), 178–195. https://doi.org/10.1002/ncp.10474
20. Mitchell, J. S., Hermens, D. F., Bennett, M. R., Can, A. T., & Lagopoulos, J. (2023). Ketamine and zinc: Treatment of anorexia nervosa via dual NMDA receptor modulation. *CNS Drugs, 37*(2), 159–180. https://doi.org/10.1007/s40263-022-00984-4
21. Westmoreland, P., Krantz, M. J., & Mehler, P. S. (2016). Medical complications of anorexia nervosa and bulimia. *The American Journal of Medicine, 129*(1), 30–37. https://doi.org/10.1016/j.amjmed.2015.06.031
22. Hay, P. J., Touyz, S., Claudino, A. M., Lujic, S, Smith, C. A., & Madden, S. (2019). Inpatient versus outpatient care, partial hospitalisation and waiting list for people with eating disorders. *Cochrane Database of Systematic Reviews, 2019*(1), CD010827. https://doi.org/10.1002/14651858.CD010827.pub2
23. Berner, L. A., Brown, T. A., Lavender, J. M., Lopez, E., Wierenga, C. E., & Kaye, W. H. (2019). Neuroendocrinology of reward in anorexia nervosa and bulimia nervosa: Beyond leptin and ghrelin. *Molecular and Cellular Endocrinology, 497*, 110320. https://doi.org/10.1016/j.mce.2018.10.018
24. Herpertz-Dahlmann, B., & Dahmen, B. (2019). Children in need—Diagnostics, epidemiology, treatment and outcome of early onset anorexia nervosa. *Nutrients, 11*(8), 1932. https://doi.org/10.3390/nu11081932
25. Herpertz-Dahlmann, B. (2017). Treatment of eating disorders in child and adolescent psychiatry. *Current Opinion in Psychiatry, 30*(6), 438–445. https://doi.org/10.1097/YCO.0000000000000357
26. Dauty, M., Menu, P., Jolly, B., Lambert, S., Rocher, B., Le Bras, M., Jirka, A., Guillot, P., Pretagut, S., & Fouasson-Chailloux, A. (2022). Inpatient rehabilitation during intensive refeeding in severe anorexia nervosa. *Nutrients, 14*(14), 2951. https://doi.org/10.3390/nu14142951
27. Herpertz-Dahlmann, B. (2021). Intensive treatments in adolescent anorexia nervosa. *Nutrients, 13*(4), 1265. https://doi.org/10.3390/nu13041265
28. Harrington, B. C., Jimerson, M., Haxton, C., & Jimerson, D. C. (2015). Initial evaluation, diagnosis, and treatment of anorexia nervosa and bulimia nervosa. *American Family Physician, 91*(1), 46–52.
29. Lacalaprice, D., Mocini, E., Frigerio, F., Minnetti, M., Piciocchi, C., Donini, L. M., & Poggiogalle, E. (2023). Effects of mealtime assistance in the nutritional rehabilitation of eating disorders. *Eating and Weight Disorders, 28*(1), 73. https://doi.org/10.1007/s40519-023-01605-9
30. American Psychiatric Association. (2006). Treatment of patients with eating disorders, third edition. *The American Journal of Psychiatry, 163*(7, Suppl.), 4–54.
31. American College of Obstetricians and Gynecologists. (2018). ACOG Committee Opinion No. 740: Gynecologic care for adolescents and young women with eating disorders. *Obstetrics & Gynecology, 131*(6), e205–e213. https://doi.org/10.1097/AOG.0000000000002652
32. Spanos, K. E., Wright, T. S., DeAngelis, C., & Essayli, J. H. (2025). Assessing obstetrics and gynecology (OBGYN) clinicians' knowledge, practice, and attitudes toward anorexia nervosa, atypical anorexia nervosa, and amenorrhea. *Journal of Pediatric and Adolescent Gynecology, 38*(3), 351–357. https://doi.org/10.1016/j.jpag.2024.12.017
33. Jhe, G. B., Recto, M., Vitagliano, J. A., Rose, K. L., Richmond, T., Freizinger, M., & Lin, J. (2024). Growing up in a larger body: Youth- and parent-reported triggers for illness and barriers to recovery from anorexia nervosa. *Journal of Eating Disorders, 12*(1), 192. https://doi.org/10.1186/s40337-024-01156-z
34. Boyar, R. M., Katz, J., Finkelstein, J. W., Kapen, S., Weiner, H., Weitzman, E. D., & Hellman, L. (1974). Anorexia nervosa: Immaturity of the 24-hour luteinizing hormone secretory pattern. *The New England Journal of Medicine, 291*(17), 861–865. https://doi.org/10.1056/NEJM197410242911701