Abstract

Objective: this paper is a review on the topic of adolescent-onset anorexia nervosa. According to the literature, this disorder presents high morbidity and mortality, with increasing incidence over the last decades, thus enhancing the importance of scientific investigation on the subject.

Methods: the authors performed a non-systematic review of the related literature and also reported their clinical experience.

Results: age and gender are important risk factors. The peak of incidence occurs in adolescence and the prevalence is 9 times higher in females. It was initially believed that anorexia nervosa manifested itself only in higher socioeconomic levels, which are more highly exposed to the demands of western beauty standards. More recent studies have identified similar incidence of this disorder also in lower socioeconomic levels, rural areas and Asian communities. The clinical features are: refusal to maintain weight at or above a minimal normal weight for age; high, intense fear of gaining weight or becoming fat, even though underweight; disturbance in the way of experiencing one’s body weight or shape, and amenorrhea. The most common physical complications are similar to those of chronic malnutrition and depression is the main comorbidity.

Conclusions: treatment should be multidisciplinary, taking into account the plurality of etiological factors. Family therapy plays an important role, particularly when this disorder manifests itself during adolescence.


Introduction

Nutrition plays a very important role in adequate child and adolescent development. The maintenance of an adequate nutritional pattern reflects on physical and mental health of young people, allowing them to take advantage of their potentiality. Adolescents and the adults they live with sometimes are not aware of adequate nutritional patterns. The degree and types of involvement of normal nutritional patterns vary widely. Some inadequate behavior such as exclusion of certain kinds of food or meals during the day and unbalanced diets may appear isolatedly or as part of a psychiatric disorder.

Anorexia nervosa (AN), a nutritional disorder that is more common among adolescents, is a serious psychiatric condition with possibly fatal consequences. Morbidity and mortality estimates for AN range between 4% and 8%. AN is characterized by extreme changes in eating habits, regarded as pathological (restricting-type anorexia nervosa), associated with other eating behaviors related to weight...
control such as laxative drugs and amphetamines (present in appetite suppressants), self-induced vomiting and excessive physical exercises (anorexia nervosa, bulimic subtype). The currently accepted etiological model is multifactorial, including biological, psychological, and familial characteristics, and socioeconomic and cultural risk factors. Consequently, multidisciplinary aspects will be discussed, focusing on family approach, which is fundamental in the case of adolescent-onset anorexia nervosa.

**Epidemiological data**

AN has been a great concern to public health in western world. There have been some discussions on the apparent increase in the incidence of AN and also on its recognition in other non-western cultures.

There are several epidemiological studies on nutritional disorders, most of which were carried out in western countries, especially United States and Europe. Epidemiological data show an important increase in the incidence and prevalence of such disorders throughout the last four decades. Rates ranged from 0.08 in Sweden in the 1940s and 8.2 in North America between 1935 and 1976 per 100,000 individuals in the population at large. In Scotland, the rate was 4.06 per 100,000.

These rates may be much higher in populations at risk (female adolescents). The results varied from 0.55 in Monroe-NY between 1960 and 1976 and 56.7 in Rochester per 100,000. In the study conducted by Szmukler (1986), there was an increase in incidence from 4.06 to 30 per 100,000, when only the population at risk was taken into consideration. A comprehensive epidemiological study carried out in Sweden assessed 15-year-old schoolers in Göteborg, and found a prevalence of 0.84% for girls and 0.09% for boys. Relatively high prevalence rates were found among fashion design students (3.5%) and professional dancers (8.6%). Very recently, data on the incidence of AN are 0.7% for adolescents, 0.2% for boys and 1.1% for girls.

**Risk Factors**

We could observe a great variation in AN incidence and prevalence rates. This variation seems to be associated with populations at risk. Among risk factors, age group and gender are clearly involved. The most common age for AN onset is adolescence, and there is a high increase in prevalence among women. Only 5 to 10% of AN patients are males.

In the beginning, nutritional disorders were believed to affect only the upper socioeconomic class in western countries. This association, however, is not that large and may reflect a referral bias as epidemiological studies were initially conducted in hospitalized patients.

Very recently, population studies have shown little or no association between nutritional disorders and socioeconomic level. A study carried out in Minnesota, based on data obtained from the Minnesota Adolescent Health Survey in 1988, in public schools, showed an association between parents’ socioeconomic level and adolescents’ dissatisfaction with their body image. However, no association between nutritional disorders and socioeconomic level was found. A review of literature, including articles that assess the interference of socioeconomic factors also concluded that there is insufficient scientific evidence to confirm that AN rates are higher in populations with high socioeconomic level.

Two studies conducted in Japan compared urban and rural populations by investigating cultural aspects as risk factors. One of these studies found that AN prevalence in high schools in the city of Kyoto was 0.2%, but in the surrounding rural areas, the prevalence was 4 times lower (0.05%). The other study reported an AN prevalence rate three times lower for Japanese girls in rural areas than those in urban areas. With different results, public school female students in a rural area in southern Italy were assessed, and a prevalence rate similar to that of urban or metropolitan areas was found.

**Etiology**

The search for a unique cause of anorexia nervosa has already been discarded. Nowadays, biological, psychological, familial, social and cultural characteristics are believed to be the factors that determine the onset of AN.

Among biological characteristics, genetic factors should be considered. We found that the incidence of anorexia nervosa among patients’ sisters is 6%, approximately six times higher than the highest values found in population studies. More recently, a study with 45 pairs of twins observed that the concordance for the onset of anorexia nervosa in dizygotic individuals was 5%, while monozygotic individuals presented a concordance of 56%. These findings proved that genetic factors play a vital role in the onset of anorexia nervosa.

As to psychological characteristics, the most commonly found description comprises frustrated, dissatisfied and angry individuals, who feel unable to condemn the “concern” with their dissatisfaction. On the contrary, they believe their own necessities are inadequate and should be denied.

There are some family-related characteristics that also appear in the families of AN patients. Among these characteristics, we have: rigid homeostatic systems, overprotection, excessive involvement of family members, and little encouragement for change. There is no evidence that these characteristics should be considered as the causes for anorexia nervosa. Alternatively, individuals may develop this nutritional disorder for other reasons, regardless of family organization, but the symptoms presented may be used and kept by families for their own reasons.
Biological, psychological and family-related characteristics, associated with social and cultural risk factors, interact and act alternately or concomitantly as predisposition, precipitation and maintenance factors of anorexia nervosa. This whole set of etiological factors take for granted that therapy approaches are also multidisciplinary.

Clinical Status

In anorexia nervosa, there is a special concern with weight, physical fitness, and mainly weight loss. Even when extremely thin, patients usually feel they are fat or disproportionate, which is defined as body image distortion. These patients have a deep desire for losing weight, which, contrariwise, increases as weight is lost. Weight loss becomes individuals’ main objective, and to achieve it, they may practice excessive physical exercises, use laxative drugs, diuretics and/or appetite suppressants, in addition to drastic changes in eating behavior (dieting and fasting periods). Weight in anorexic patients is 15% or more lower than the expected limit for age or height. Another important finding on clinical status is the presence of amenorrhea in at least three consecutive menstrual cycles.

The clinical features of adolescent-onset anorexia nervosa are similar to those found in adult patients, although there are some peculiarities. Prepubertal adolescents tend to have higher edema rates due to different distribution of adipose tissue, if compared to older individuals with similar level of malnutrition. Young adolescents seem to deteriorate faster in terms of weight loss, and therefore, they tend to present the most severe stages of anorexia nervosa at an earlier date: for instance, symptoms of depression, which are presented by adults only later, may be observed at the very beginning of the clinical status in young adolescents. Binge-eating and abuse of laxatives are manifested differently in young adolescents, and are more frequent among these than in adult patients.

Diagnostic Criteria

(a) Refuses to maintain the minimum weight according to age and height, for instance, maintenance of weight loss 15% or more beyond expectations or no weight gain according to what is expected for that growth stage, causing weight to be less than 85% of what is expected.
(b) Constant fear of gaining weight or getting fat, even if underweight.
(c) Disturbance in the way of experiencing body weight and shape, negative influence of shape and body weight on self-assessment, or refusal to admit the severity of current low weight.
(d) Amenorrhea, in postmenarcheal women.

There are two types of anorexia nervosa:

- Restricting-type: Eating behaviors that prioritize control over food intake, as, for example, restrictive meals (ex.: low-calorie, low-fat or low-protein diets), reduction in the number of daily meals, or fasting, which can last some hours or for longer periods.
- Bulimic-type (binge-eating/purging): There is prevalence of purging behavior like vomiting, diarrhea caused by abusive use of laxatives; use/abuse of appetite suppressants and laxatives, excessive physical exercises aimed at weight loss, in addition to restrictive behavior.

Clinical complications

Physical consequences are similar to those of chronic malnutrition. When AN affects children or adolescents, it interferes with the growth curve, causing them to have height deficiencies, and delayed or interrupted pubertal development.

Table 1 summarizes some of the major clinical complications caused by anorexia nervosa. Most of these complications are compensatory mechanisms presented by the organism in an attempt to adjust reduced food intake. The body reacts as if there were a shortage of food in the environment and suppresses or reduces all essential functions, minimizing energy expenditure and occasionally changing vital functions.

The most severe cases of anorexia nervosa are more easily identifiable. Intense weight loss, prolonged evolution of the disease, uncovered food rejection are the most obvious indicators of AN.

Table 2 shows diagnostic signs of less severe cases, or cases with shorter time of evolution.

Comorbidities

Comorbidity studies report disorders that precede, accompany and persist (or even develop) after AN treatment. Comorbidities may complicate treatment but can also contribute to the identification of causes, risk factors and prognosis of anorexia nervosa.

Emotional Disorders

Major depression is the most common disorder in cases of anorexia nervosa. Emotional disorders account for 70% of comorbidities on admission of AN patients and major depression is diagnosed in 53% of patients who are submitted to treatment.

Studies on depression among AN patients present methodological hindrances and bring up the matter of causality: Is depression secondary to nutritional disorders
Table 1 - Physical consequences of anorexia nervosa

<table>
<thead>
<tr>
<th>Vital signs</th>
<th>Bradycardia</th>
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<tr>
<td></td>
<td>Hypotension</td>
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<td></td>
<td>Hypothermia</td>
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<tr>
<td>Central nervous system</td>
<td>Diffuse cerebral atrophy</td>
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<td></td>
<td>Occasionally regional atrophy</td>
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<tr>
<td>Cardiovascular system</td>
<td>Peripheral edema</td>
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<td></td>
<td>Reduced cardiac diameter</td>
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<td>Reduced response to physical effort - exercise</td>
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<td></td>
<td>Superior mesenteric artery syndrome</td>
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<tr>
<td>Renal</td>
<td>Prerenal uremia</td>
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<tr>
<td>Hematological</td>
<td>Anemia</td>
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<tr>
<td>Gastrointestinal</td>
<td>Slow gastric emptying</td>
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<td></td>
<td>Gastric dilation</td>
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<td></td>
<td>Reduced intestinal lactase and lipase</td>
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<tr>
<td>Metabolic</td>
<td>Hypercholesterolemia</td>
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<td></td>
<td>Hypercarotenemia</td>
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<td></td>
<td>Hypoglycemia</td>
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<td></td>
<td>Increase in hepatic enzymes</td>
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<tr>
<td>Endocrinological</td>
<td>Luteinizing hormone decrease</td>
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<td></td>
<td>Follicle-stimulating hormone decrease</td>
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<td>Estrogen or progesterone decrease</td>
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<td>Normal thyroxin decrease</td>
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<td>Triiodothyronine decrease</td>
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<td>Reverse triiodothyronine increase</td>
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<td></td>
<td>Cortisol increase</td>
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<td></td>
<td>Growth hormone increase</td>
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<td>Partial diabetes insipidius</td>
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</table>

This study also compared the diagnostic rate of anxiety disorders among AN patients after a 10-year follow-up period and found that 40% of patients who presented AN symptoms had a diagnosis of anxiety disorders compared to only 17.6% in AN asymptomatic patients.

Table 2 - Clinical signs for diagnostic help in anorexia nervosa

1. Weight loss of unknown etiology
2. Inadequate height and weight growth
3. Primary or secondary amenorrhea of unknown etiology
4. Hypercholesterolemia or hypercarotenemia of unknown etiology in young adults
5. Clinical complications due to excessive exercise
6. Participation in risk groups: ballet dancers, models, jockeys
7. Osteoporosis in young individuals

Personality Disorders

Personality traits and disorders may have an important role in psychopathology, treatment and prognosis of anorexia nervosa. Certain personality aspects may change or rise as a consequence of the status of anorexia nervosa, or may be considered as prediction factors for the prognosis.

Personality disorder and anorexia nervosa comorbidity rates range from 20% to 80%. Borderline personality disorder and antisocial personality disorder are the most commonly found disorders among anorexic patients. However, malnutrition status may have an influence over the characteristics of personality disorders in AN patients.

The personality traits that are commonly found in AN patients are obsessiveness, dependency, strictness, control over impulses and perfectionism.

Treatment

Anorexia nervosa in children may lead to severe physical complications and is usually associated with chronic morbidity. Some children die of anorexia nervosa or its complications. In the case of a disorder with severe consequences, early treatment through an intensive and comprehensive program is recommended (Table 3).

Psycho-educational Aspects

An essential part of the treatment consists of explaining to families what anorexia nervosa is. Parents and children need a clear and objective report on the diagnosis, maintenance factors, treatment and prognosis. Parents are
usually eager to discuss about the causes of AN on their children, but this is actually counterproductive. It is more important to focus on the factors that contribute to clinical status maintenance and on the identification of possible ways to fight these factors.29

<table>
<thead>
<tr>
<th>Table 3 - Anorexia nervosa treatment</th>
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<tr>
<td>(a) Psychoeducation (patients and relatives): presentation and discussion of concepts such as the diversity of etiologic factors, clinical status, and treatment</td>
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<tr>
<td>(b) Dietary reeducation: theoretical classes, practical approaches, and follow-up of patients during their meals</td>
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<tr>
<td>(c) Use of medication: based on the presence of associated psychiatric status (comorbidities), such as depression, for example</td>
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<tr>
<td>(d) Cognitive-behavioral therapy: techniques aiming at changing inadequate cognitive and behavioral aspects, though positive and negative reinforcements</td>
</tr>
<tr>
<td>(e) Individual psychotherapy: associated with other approaches (it usually should not be used isolatedly)</td>
</tr>
<tr>
<td>(f) Orientation and/or familial therapy: approach of aspects from the familial dynamics (important in the treatment of anorexia nervosa in the beginning of adolescence)</td>
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**Nutritional Aspects**

Nutritional treatment of anorexia nervosa is targeted at: restoring normal physiological functions, promoting gradual weight gain and providing patients with information that help them adopt healthy eating habits.

According to the American Dietetic Association,30 the nutritional treatment used for anorexia nervosa may be divided into two stages. At the first stage, the objective is to provide information that help patients change their behavior in terms of weight and eating habits. This stage is aimed at:

- Collecting detailed information about patients’ eating behavior or habits.
- Setting up a cooperative relationship between patient and nutritionist, in which the patient participates actively.
- Discussing about concepts involving food categories, balanced diet, nutrition and weight regulation.
- Providing examples of adequate food intake to help patients understand the changes they will be submitted to during treatment.

The second stage has the following objectives:

- Changing patients’ eating behavior progressively until it is regulated.
- Increasing patients’ weight gradually.

Restored feeding with the aim of providing weight gain should start just with enough calories to meet basal metabolic needs according Harris Benedict formula, after adequate adjustments, considering that adolescents who suffer from anorexia nervosa present a reduction of approximately 50% in their basal metabolism.31 The increase of energy intake for the promotion of gradual weight gain should be between 200 - 500 calories a week.

Nutritional education also involves field activities such as meals at self-service restaurants, food portioning preparation, simulated supermarket shoppings and practical identification of nutrients (labeling) etc.

**Pharmacological Aspects**

The use of medication plays a small but important part in the treatment of anorexia nervosa. Psychopharmaceuticals already used include: appetite stimulants, neuroleptics, antidepressants, vitamins, iron, zinc, and other ways of supplementation of mineral salts.32

There is no scientific evidence on the use of the so-called appetite stimulants. This is not a surprising fact if we recall that there is no loss of appetite in the case of AN. Consequently, there is no indicative sign for the use of this kind of medication in adolescence.

Neuroleptics also play a small part in the treatment of AN. They should be used only in cases of severe anxiety and their use must be controlled by a child psychiatrist. There is no evidence that neuroleptics change the course of AN or alleviate its symptoms.

Antidepressants play a more important role in the treatment of childhood AN than other psychopharmaceuticals. When children present depression with psychomotor slowness, feeling of guilt and underestimation, and neurovegetative symptoms such as sleep pattern changes, tricyclic drugs such as amitryptiline produce a certain effect.

Supplementation of vitamins and mineral salts are very popular, but no positive results have been demonstrated.

**Psychological Aspects and Family Therapy**

Individual and familial psychological approach is an essential part in the treatment of adolescent-onset anorexia nervosa. Usual techniques vary, and should be selected according to the conditions of each adolescent. Cognitive and behavioral psychological techniques, individual psychodynamic psychotherapy, family therapy and psychoeducational family approach play a significant role in the treatment of adolescent-onset AN, and should be adopted in association with the other forms of treatment previously mentioned.
Especially during adolescence, inclusion of family in the treatment of anorexia nervosa is a central part for an efficient therapy.\textsuperscript{33} This inclusion occurs not because family is seen as the etiological source of the disease, but because their suffering and distress for having one of the family members affected by anorexia nervosa can be heeded and dealt with. As previously shown, this inclusion is based on the fact that the genesis, development and maintenance of these disorders are determined by biological, psychological, family-related, social and cultural factors. Family-related factors are particularly relevant in the case of adolescent patients.

The participation of family members in the treatment is very important; however, more often than not, parents act frightenedly and are reluctant to cooperate, and therefore need to be encouraged. From the very first meetings with the family, it is important that room for questions and doubts be provided. Family therapy works as support and also dampening device for feelings of guilt, anger, hostility and feelings of helplessness, which are very common in families whose members suffer from nutritional disorders.

Family approach is an important tool for therapists, allowing families to join in and merge their efforts and interests in rehabilitating patients.

Hospitalization

Basically, treatment should be carried out in clinics. Professionals involved in the treatment should decide about hospitalization, which is recommended in any of the following cases:

- weight less than 80\% of the weight that is expected for patient’s age and height;
- risk physical conditions such as dehydration or comorbidities (e.g.: diabetes);
- signs of blood circulation failure such as low blood pressure, low pulse, poor peripheral circulation
- persistent vomiting or hematemesis
- risk psychiatric conditions (e.g.: self-infliction, depression, obsessive symptoms or severe purging behavior);
- insufficient response to treatment in clinics.

Conclusion

Adolescent-onset anorexia nervosa has presented increased incidence throughout the last decades and has been reported by different cultures and social classes. It is a disorder with potentially high morbidity and mortality, presenting multifactorial etiology. Therefore, treatment should be ideally conducted by a multidisciplinary team (psychiatrist, psychologist, nutritionist, occupational therapist, pediatrician or general practitioner and nurse) and hospitalization should be recommended in certain cases. Medication should be used for the treatment of comorbidities. Team members should communicate on an intensive basis so that approaches can be coherent and consistent, allowing adolescents and their families to take good advantage of all the effort devoted to them. Research continues to be carried out in all areas presented in this article. Obtained information will be progressively assembled so that patients, family members and professionals involved in the treatment can optimize expected results.

References


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