

Title

Clinical Study of Early-Onset Eating Disorders

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Key words: adolescence, anorexia nervosa, bulimia nervosa, childhood, early-onset

## Abstract

**Background:** In recent years, the prevalence of eating disorders has been increased. In Japan, however, few clinical studies of eating disorders in children and preadolescents have been performed.

**Objective:** To examine the clinical features, comorbidity, clinical courses and general outcome of early-onset eating disorders.

**Subjects and Methods:** Forty four children and adolescents (4 boys and 40 girls, 9 to 14 years old) with eating disorders diagnosed by DSM-IV criteria, who had been referred to the Department of Psychiatry at Hokkaido University Hospital between 1991 and 2000, were studied.

**Results:** Patients with early-onset eating disorders accounted for 12.5% of all those with eating disorders. Of the 44 patients, 22 (50%) were classified into anorexia nervosa, restricting type (AN-R), 7 (16%) anorexia nervosa, binge-eating purging type (AN-BP), 8 (18%) bulimia nervosa, purging type (BN-P), and 7 (16%) bulimia nervosa, non-purging type (BN-NP) at a point of investigation. There was a high rate (73%) of comorbidity in early-onset eating disorder patients. The general outcome for patients with early-onset eating disorders was excellent for 37%, good for 29%, slightly good for 13%, and poor for 21%.

**Conclusions:** The patients of AN-R exhibited the most characteristic symptoms in early-onset eating disorder patients. The AN-R and BN-P groups have generally favorable outcomes and that the AN-BP and BN-P groups have generally poor outcomes.

**Key words:** adolescence, anorexia nervosa, bulimia nervosa, childhood, early-onset

## **Introduction**

The increase in the prevalence of eating disorders in recent years has been accompanied by an increase in the number of reports of eating disorders during childhood or preadolescence. Moreover, elucidation of the course and prognosis of eating disorders has brought to light problems such as changes in symptoms, chronicity, or other complicating psychiatric disorders, renewing awareness of the need for early treatment. Therefore, investigating the clinical characteristics, course, and outcome of early-onset eating disorders may not only provide guidelines for the treatment of eating disorders but also make a significant contribution to our understanding of the psychopathology of these disorders.

We investigated early-onset eating disorders that initially occurred at 14 years of age or younger. Subjects were typed according to the diagnostic criteria of DSM-IV (American Psychiatric Association, 1994) and the clinical characteristics of each type were recorded. Subsequently, the psychopathology, treatment, course, and outcome of each type were examined.

## **Subjects and Methods**

### **1. Subjects**

During the 10-year period between January 1991 and December 2000, 352 patients classified as having eating disorders based the diagnostic criteria of DSM-IV were initially evaluated in the Department of Psychiatry, Hokkaido University Hospital. Of these, 44 patients (4 males, 40 females) who were 14 years of age or younger were included in the investigation.

### **2. Methods**

The method used to examine the patients involved discussing (1) their family history of psychiatric disorders, (2) life history, (3) age at onset and age on initial examination, (4) circumstances of onset, (5) history of present illness, (6) clinical features, (7) diagnosis, (8) treatment, (9) course, and (10) outcome.

Drug therapy for patients who received such therapy for 2 months or longer was evaluated on a 4-step scale based on the Clinical Global Impression scale (National Institute of Mental Health, 1985): excellent efficacy, good efficacy, fair efficacy, no change, or worsening.

Outcome for patients whose course could be followed for 3 months or longer was evaluated at three times: treatment completion, transfer to another facility, or discontinuation. The condition of patients who were continuing therapy was recorded on June 30, 2001. Outcome was assessed from the aspects of physical status, eating behavior/psychiatric symptoms, and social adjustment on the following 5-step scale: remission, good improvement, slight improvement, no change, or worsening. Differences were tested for significance using a t-test, a chi-square test, ANOVA, Scheffe's multiple comparison test, and the Mann-Whitney U-test.

## **Results**

### **1. General data**

#### **1) Baseline characteristics**

Patients' baseline characteristics are shown in Table 1. The 44 subjects constituted 12.5% of the overall population of patients with eating disorders (352 patients). Four subjects were male and 40 were female (male-female ratio, 1:10). The mean age at onset and age at initial evaluation were  $13.3 \pm 1.4$  and  $14.2 \pm 1.7$  years, respectively, while the mean duration of morbidity was  $11.1 \pm 9.8$  months. The minimum age was 9 years, 10 months, and a trend toward an increase was observed from age 12.

At the initial evaluation, the subjects' mean height was  $154.3 \pm 7.8$  cm, mean weight was  $36.9 \pm 10.6$  kg, mean BMI was  $15.3 \pm 3.5$ , and mean obesity rate was  $-25.4\% \pm 10.4\%$ . Of the 40 female subjects, 9 had not reached menarche, and 29 had reached menarche at a mean age of  $11.4 \pm 1.2$  years. The menarche status of the remaining 2 subjects was unknown.

Fourteen (31.8%) patients (including patients with genetic history of multiple disorders) had a genetic history of mental illness, including a genetic history of mood disorders (n=9), eating disorders (n=3), schizophrenia (n=1), delayed development (n=1), and suicide (n=1).

#### **2) Diagnostic classifications (Table 2)**

In all patients, the condition at initial onset was anorexia nervosa, restricting type (AN-R). Initially, no patients had bulimia nervosa. At the final diagnosis, 22 patients had AN-R, 7 had anorexia nervosa, binge-eating/purging type (AN-BP), 8 had bulimia nervosa, purging type (BN-P), and 7 had bulimia nervosa, nonpurging type (BN-NP).

### **3) Comorbid disorders**

Patients' comorbid psychiatric disorders are shown in Table 3. If 2 or more disorders were present, multiple disorder names were recorded. Comorbid disorders (total, 37 disorders) were seen in 32 (72.7%) patients (including patients with multiple disorders). By type of disorder, the most common type of comorbid disorder was mood disorder (n=25), followed by major depressive disorder (n=5), minor depressive disorder (n=18), and bipolar disorder (n=2). Obsessive-compulsive disorder was observed in 7 patients. Three patients had developed schizophrenia. Attention-deficit hyperactivity disorder and trichotillomania were each observed in 1 patient.

### **4) Outcome**

After excluding 6 patients who transferred to another facility or discontinued after undergoing only the initial assessment, the outcome of the remaining 38 patients included remission for 14 (36.8%) patients, good improvement for 11 (28.9%) patients, slight improvement for 5 (13.2%) patients, and no change for 8 (21.1%) patients. The mean observation period was  $23.9 \pm 24.2$  months (range, 3 to 124 months) after initial evaluation and  $33.3 \pm 25.7$  months after onset.

## **2. Clinical characteristics of each type of eating disorder**

### **1) Anorexia nervosa, restricting type (AN-R)**

For the 22 patients with AN-R, the mean age at onset was  $12.7 \pm 1.5$  years. Four of the subjects were male and 18 were female. Seven of the 18 females had not yet reached menarche. In 7 patients, the precipitating factor in the onset of the eating disorder was clearly dieting. Circumstances at onset included problems at school (n=18), family problems (n=8), a death or separation (n=5), a physical illness (n=5), and stress outside of school (n=2).

Five patients had an intense fear of becoming obese, and 17 resisted nutritional support. Five patients did not initially indicate that they wished to lose weight but later acknowledged that they did. Eight patients had a severely impaired body image, and 14 indicated that they were unconcerned or denied their concern about serious weight loss. Hyperactivity was seen in 7 patients. Observed problem eating behaviors were the discarding of food by 2 patients and vomiting by 3 patients. Signs of impulsiveness were irritability and violent behavior each observed in 1 patient.

Twelve patients had a depressive disorder during the course of their illness. The comorbid disorder was major depressive disorder in 1 patient and minor depressive disorder in 11 patients. Six patients had a obsessive-compulsive depressive disorder during the course of their illness. Obsessive-compulsive disorder manifested as hand washing in 5 patients, ritualistic/perfectionistic behavior in 3 patients, and arranging/ordering behavior in 1 patient. Trichotillomania and attention-deficit hyperactivity disorder were each observed in 1 patient.

Nine patients were treated by intravenous hyperalimentation (IVH), 8 by peripheral intravenous infusion, and 1 by nasal feeding. Antidepressant drug therapies were administered to 15 patients (excellent efficacy, 1 patient; good efficacy, 6 patients; fair efficacy, 3 patients; no effect, 5 patients). Behavioral psychotherapy was administered for 15 patients, while family therapy was administered for 20 patients. As required, cognitive behavioral therapy and art therapy were concurrently administered with these forms of psychotherapy.

Examination of outcome for the 20 patients whose course was followed for 3 months or longer showed remission in 12 (60%) patients, slight improvement in 3 (15%) patients, and no change in (10%) 2 patients.

## **2) Anorexia nervosa, binge-eating/purging type (AN-BP)**

For the 7 patients with AN-BP, the mean age at onset was  $14.1 \pm 0.8$  years. All patients with AN-BP were female, and only 1 had not yet reached menarche. In all patients, weight loss had begun with dieting. The circumstances at onset included problems at school (n=5), family problems (n=5), a death or separation (n=2), and the presence of a family member with an eating disorder (n=2).

All of these patients had an intense fear of becoming obese. Four patients had a strong desire to lose weight, and 3 resisted nutritional support. Six patients had a severely impaired body image, and 1 indicated that she was unconcerned or denied her concern about weight loss. Hyperactivity was seen in 6 of the 7 patients. Secret eating was a problem eating behavior observed in 2 patients. Impulsivity manifested as self-injury and violent behavior in 2 patients, suicide planning in 3 patients, and running away from home in 1 patient.

Five patients exhibited a depressive disorder during the course of their illness. The disorder was major depressive disorder in 2 patients and minor depressive disorder in 3

patients.

Two hospitalized patients were treated by peripheral intravenous infusion. Antidepressant drug therapy was administered to 5 patients (good efficacy, 1 patient; fair efficacy, 2 patients; no effect, 1 patient). Family therapy was administered for 5 patients, while behavioral therapy and cognitive behavioral therapy were each administered for 2 patients.

Examination of outcome for the 5 patients whose course was followed for 4 months or longer showed slight improvement in 1 patient and no change in 3 patients.

### **3. Bulimia nervosa, purging type (BN-P)**

For the 8 patients with BN-P, the mean age at onset was  $13.4 \pm 1.0$  years. In all of the patients, weight loss had begun with dieting. The circumstances at onset (including patients with multiple disorders) were problems at school (n=6), family problems (n=4), and a separation (n=2).

Five patients had an intense fear of becoming obese, 2 resisted nutritional support but did not verbalize a fear of becoming obese, and 1 had a strong desire to lose weight. Four patients had a severely impaired body image. Hyperactivity was observed in 4 of the 8 patients. Secret eating was a problem eating behavior observed in 2 patients. Observed impulsivity problems were shoplifting in 3 patients and violent behavior in 2 patients.

Three patients had a mood disorder during the course of their illness. The disorder was major depressive disorder in 1 patient, minor depressive disorder in 1 patient, and bipolar II disorder in 1 patient. The remaining patient had developed schizophrenia during the course of the illness.

Three hospitalized patients were treated by peripheral intravenous infusion and 1 patient was treated by IVH. Five patients were administered antidepressant drug therapy (good efficacy, 1 patient; fair efficacy, 2 patients; no effect, 2 patients), and 1 was administered antipsychotic drug therapy (no effect). Behavioral therapy was administered for 4 patients, while family therapy was administered for 6 patients, and cognitive behavioral therapy and art therapy were each administered for 2 patients.

Examination of outcome for the 6 patients whose course was followed for 4 months or longer showed good improvement in 2 patient, slight improvement in 1 patient, and no change in 3 patients.

#### **4) Bulimia nervosa, nonpurging type (BN-NP)**

For the 7 patients diagnosed with BN-NP, the mean age at onset was  $14.1 \pm 0.6$  years. All of the patients with BN-NP were females, and only 1 had not reached menarche. In 5 of the 7 patients, weight loss had begun with dieting. Circumstances at onset included problems at school (n=5), family problems (n=5), a separation (n=3), and a physical illness (n=1).

Five patients had an intense fear of becoming obese, and 2 resisted nutritional support. Two patients had a strong desire to lose weight. Four patients had a severely impaired body image. Hyperactivity was observed in 1 patient. Secret eating was a problem eating behavior observed in 2 patients. Observed impulsivity problems were running away from home (n=1), violent behavior (n=1), self-injury (n=1), and suicide planning (n=2).

Five patients had a mood disorder during the course of their illness. These disorders were major depressive disorder, in 2 patients, minor depressive disorder in 2 patients, and bipolar II disorder in 1 patient. Obsessive-compulsive disorder, conversion disorder, and panic disorder were each seen in 1 patient.

Treatment consisted of IVH for 2 patients. All of the patients received drug therapy for 2 months or longer. Six patients were administered antidepressants (good efficacy, 4 patients; slight efficacy, 1 patient; no effect). Carbamazepine and lithium were used for 1 patient with bipolar disorder (good efficacy), and carbamazepine and haloperidol were used for 1 patient in an emotionally labile state (no effect). Behavioral psychotherapy was administered to 3 patients, family therapy was administered to 6 patients, cognitive behavioral therapy was administered to 1 patient, and art therapy was administered to 4 patients.

The course of all 7 patients was followed for 4 months or longer, with an outcome of remission in 1 patient, good improvement in 5 patients, and slight improvement in 1 patient.

#### **4. Comparison of outcome for different types of eating disorders**

Outcome is shown by type of eating disorder in Table 4. Comparison of the different types using the Mann-Whitney U-test with the Bonferroni inequality adjustment (using significance levels  $\leq 0.0083$ ) showed outcome to be significantly better in the AN-R group when compared with the AN-NP group ( $p = 0.0072$  after tie

correction).

## **Discussion**

### **1. Clinical characteristics of each type of eating disorder**

#### **1) Anorexia nervosa, restricting type (AN-R)**

In this group, AN-R persisted from onset to final diagnosis. Patients in this group have appetite and weight loss precipitated by stress related to school or their family. Seven of the patients were clearly dieting; however, it was unclear whether the remaining 15 patients were dieting. Although the patients seldom verbalized a fear of becoming obese, they resisted efforts to increase their weight (e.g., intravenous infusion, nasal feeding, IVH). More than a few patients said, "I do not know why, but gaining weight scares me." Many of the patients did not verbalize a desire to lose weight. Furthermore, the patients seldom verbalized body image impairment, and many indicated an absence of concern or denial with respect to the seriousness of their current low weight. Hyperactivity and impulsivity were not prominent features. The patients were susceptible to concomitant physical symptoms such as abdominal pain and nausea. In some cases, the patient's course was characterized by a precipitating physical illness, such as a cold or pneumonia, followed by the onset of the eating disorder. Many of the patients had a serious physical condition, and many underwent primarily inpatient treatment, particularly IVH (Denda et al, 1997). Many patients had complicating minor depressive disorder and obsessive-compulsive disorder during the course of their illness. Behavioral therapy was effective and provided a favorable outcome for many patients.

The patients in this group are unable to clearly express their emotions. They experience a temporary loss of appetite precipitated by stress at school or home. As their inability to eat persists, the patients attract the attention of family members and others around them, enabling them to manipulate and control their family members. Moreover, withdrawal from the stressful circumstances gives the patients a respite, providing a secondary gain from the illness. As a result, the physical symptoms of anorexia may increase in severity and consolidate, aggravating their condition. This is likely a common feature of what are referred to as psychosomatic disorders.

#### **2) Anorexia nervosa, binge-eating/purging type (AN-BP)**

This patient group initially had AN-R but subsequently engaged in recurrent an inappropriate compensatory behavior, such as bingeing, self-induced vomiting, and laxative abuse, in order to maintain their weight at  $\leq 85\%$  of normal weight. In all of the patients, the weight loss had begun with dieting. Many of the patients verbalized an intense fear of becoming obese, a desire to lose weight, and a severely impaired body image. Their clinical picture resembled that of adolescent or post-adolescent patients. These patients were susceptible to emotional lability, severe impulsivity, suicide planning, self-injury behavior, and violent behavior. These symptoms could not be explained by the patient's basic personality, but were the result of additional biological factors resulting from serious weight loss and appeared to be becoming more complex and intractable. The physical condition of many patients was serious enough to be considered life threatening. The inpatient treatment implied a refuge with respect to the treatment of psychiatric symptoms or impulsive behavior. Many patients had complicating mood disorders during the course of their illness. A poor outcome was common.

As the weight loss becomes serious in patients with this type of eating disorder, a severe, uncontrollable overeating impulse appears, with compensatory recurrent excretory behavior. While bingeing, the patients attempt to maintain the low weight through the excretory behavior. That is, aggressive efforts are made to maintain a balance between AN and BN. Consequently, the overeating impulse, which has a biological basis, becomes stronger, prompting more extreme excretory behavior and intensifying feelings of guilt and remorse. Moreover, the bingeing/purging behavior overlaps with the depressive state and emotional lability, apparently resulting in a vicious cycle whereby the illness increases in severity and become intractable.

### **3) Bulimia nervosa, purging type (BN-P)**

In this patient group, episodes of bingeing and inappropriate compensatory behavior, such as self-induced vomiting and laxative abuse, appeared during the course of the illness, but weight was maintained at  $\geq 85\%$  of normal weight. In all of the patients, the weight loss had begun with dieting. As in the AN-BP group, many of the patients clearly verbalized a fear of becoming obese and a severely impaired body image. Although a desire to lose weight was present, it was not clearly expressed. Their clinical picture was similar to that of adolescent or post-adolescent patients. The

patients were emotionally labile, with severe impulsivity. Secret eating and shoplifting were prominent behavioral problems. The occurrence of complicating mood disorders during the course of the illness was rare. Inpatient therapy was commonly performed with the purpose of treating the comorbid psychiatric symptoms resulting from conditions such as depression. As with the AN-BP group, the outcome for many patients was poor.

With respect to psychopathology, BN-P has many features in common with AN-BP. AN-P and BN-P differ according to whether weight is  $\geq 85\%$  of normal weight, and the 2 types are reciprocal in many patients. As with patients with AN-BP, patients with BN-P attempt to maintain a low body weight through excretory behavior while bingeing. Consequently, the overeating impulse, which has a biological basis, gradually weakens, but the psychological conflict becomes stronger, with intensified feelings of inadequacy, defeat, and humiliation. Moreover, as with AN-BP, the binge eating/purging behavior overlaps with a depressive state and emotional lability, forming a vicious cycle. The appropriate treatment approach is generally the same as that for AN-BP.

#### **4) Bulimia nervosa, nonpurging type (BN-NP)**

Although episodes of bingeing appeared during the course of AN-R, the patients in this group did not engage in excretory behavior, such as periodic self-induced vomiting or laxative abuse, and they maintained their weight at  $\geq 85\%$  of normal weight. Fear of becoming obese and impaired body image were present, but the patients had no desire to lose weight, or the desire was slight. Their clinical picture resembled that of adolescent or post-adolescent patients. After the onset of AN-R, the fear of becoming obese that was initially present spontaneously resolved as weight increased due to the therapy. Although impulsivity, manifested as suicide planning, self-injury, and running away from home, was observed, in many cases it was concluded to be a symptom of a complicating psychiatric disorder (e.g., depressive disorder, obsessive-compulsive disorder). Many patients had complicating mood disorders during the course of their illness. Inpatient therapy was commonly performed in order to treat comorbid psychiatric symptoms. The outcome for many patients was favorable.

As with the AN-R diet group, a condition present at the onset of the illness in many patients with this type of eating disorder is the experience of frustration or loss at school or home. Initially, the dieting remedies a feeling of emptiness or cures a sense of

sorrow, and the patient falls into a pathological state wherein the experience of frustration or loss is replaced by the pursuit of thinness. At the same time, attempts at dieting could be regarded as an effort to overcome the experience of frustration or loss for patients with this type of eating disorder. Because the initial fear of becoming obese spontaneously resolves as weight increases with therapy, the recovery of weight with therapy is often significant as a symbol of a new beginning and a fresh start.

## **2. Course and outcome**

The changes in diagnosis over time and the clinical course for the 38 patients, excluding 6 patients who transferred to another facility or discontinued after undergoing only the initial evaluation, are shown in Fig. 1. At onset, all patients were initially diagnosed with AN-R. Of these, 15 patients experienced remission (n=12) or showed good improvement (n=3), while 5 continued to have a diagnosis of AN-R. Five patients switched from AN-R to AN-BP, of whom 1 showed good improvement, and 4 continued to have a diagnosis of AN-BP. Six patients switched from AN-R to BN-P, of whom 2 showed good improvement, and 4 continued to have a diagnosis of BN-P. Seven patients switched from AN-R to BN-NP. Of these, 6 patients underwent remission (n=1) or showed good improvement (n=5), and 1 continued to have a diagnosis of BN-NP. The mean period during which type switching occurred was  $11.1 \pm 7.0$  months. From these aforementioned facts, the patients with AN-R exhibited the most characteristic symptoms in early-onset eating disorder patients (Treasure, 1997).

There was a high rate (73%) of comorbidity in early-onset eating disorder patients. The rate of comorbidity with mood disorders was 57%, with obsessive compulsive disorder 16%, and with schizophrenia 7% (Fornari et al, 1992, Kennedy et al, 1994, Braun et al, 1994, Brewerton et al, 1995).

Among the 38 patients, the outcome was remission in 14 (36.8%) patients, good improvement in 11 (28.9%) patients, slight improvement in 5 (13.2%) patients, and no change in 8 (21.1%) patients. Examination of outcome by type of eating disorder showed that outcome was significantly more favorable in the AN-R group when compared with the AN-BP group. For the most part, it appears that the AN-R and BN-P groups have generally favorable outcomes and that the AN-BP and BN-P groups have generally poor outcomes. However, the mean observation period was  $23.9 \pm 24.2$  months from initial evaluation and  $33.3 \pm 25.7$  months from onset, which is a brief

period of time when observing juvenile-onset eating disorders. It should therefore be noted that the usefulness of the present results for establishing a conclusive prognosis for juvenile-onset eating disorders is somewhat limited. An investigation involving a systematic examination of outcome will likely be necessary in the future.

### **Conclusion**

The clinical features, comorbidity, clinical courses and general outcome of early-onset eating disorders are examined. Forty four children and adolescents (4 boys and 40 girls, 9 to 14 years old) with eating disorders diagnosed by DSM-IV criteria were studied. Characteristic features of early-onset eating disorders were as follows:

1. Patients with early-onset eating disorders accounted for 12.5% of all those with eating disorders.

2. Of the 44 patients, 22 (50%) were classified into AN-R, 7 (16%) AN-BP, 8 (18%) BN-P, and 7 (16%) BN-NP at a point of investigation.

3. The patients with AN-R exhibited the most characteristic symptoms in early-onset eating disorder patients.

4. There was a high rate (73%) of comorbidity in early-onset eating disorder patients. The rate of comorbidity with mood disorders was 57%, with obsessive compulsive disorder 16%, and with schizophrenia 7%.

5. The general outcome for patients with early-onset eating disorders was excellent for 37%, good for 29%, slightly good for 13%, and poor for 21%. The AN-R and BN-NP groups have generally favorable outcomes and that the AN-BP and BN-P groups have generally poor outcomes.

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**Table 1. Patients' characteristics**

Characteristics	Subjects, number (%)
Number of patients	44
Gender, number (%)	boys 4 (9.1), girls 40 (90.9)
Mean age of onset (years)	13.3±1.4
Mean age at first consultation (years)	14.2±1.7
Family history of	14 (31.8)
Mood disorders	9 (20.5)
Eating disorders	3 (6.8)
Neurotic disorders	3 (6.8)
Schizophrenia	1 (2.3)
Mental retardation	1 (2.3)
Suicide	1 (2.3)

**Table 2. DSM-IV diagnoses**

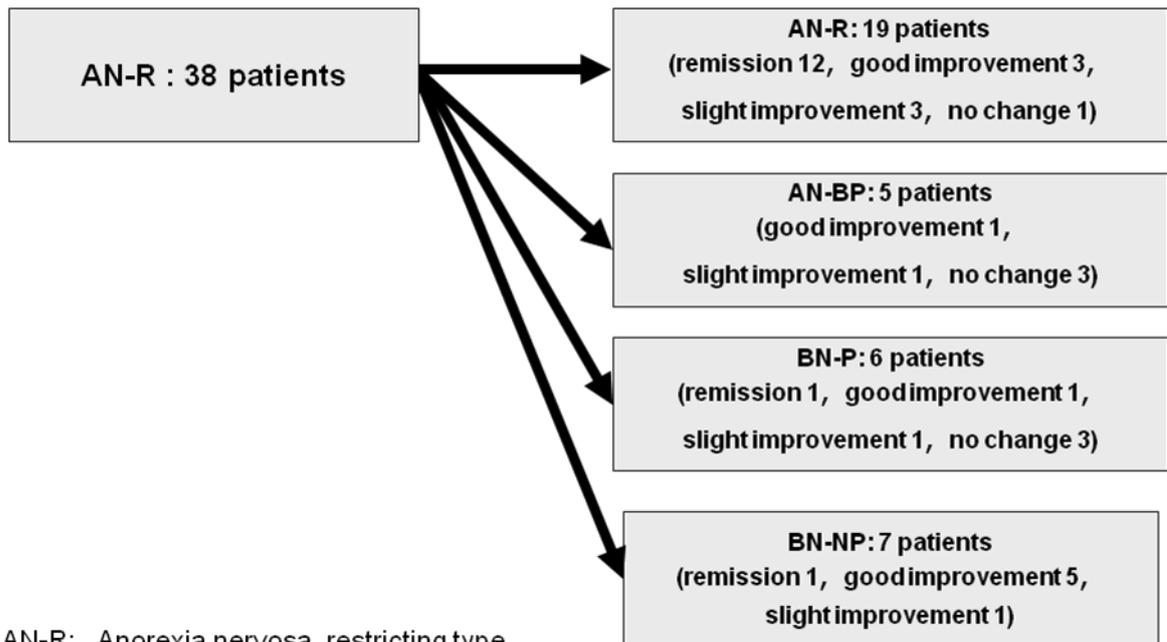
Diagnosis	Patients, number (%)
Anorexia nervosa, restricting type	22 (50)
Anorexia nervosa, binge-eating/purging type	7 (15.9)
Bulimia nervosa, purging type	8 (18.2)
Bulimia nervosa, nonpurging type	7 (15.9)

**Table 3. Comorbid psychiatric disorders**

Disorders	Patients, number (%)
<b>Mood Disorders</b>	
Major depressive disorder	5 (11.4)
Minor depressive disorder	18 (40.9)
bipolar disorders	2 (45.5)
<b>Anxiety disorders</b>	
Obsessive compulsive disorder	7 (15.9)
Schizophrenia	3 (6.8)
Attention-deficit/hyperactivity disorder (AD/HD)	1 (2.3)
<b>Impulse-control disorders</b>	
Trichotillomania	1 (2.3)

**Table 4. Outcome by type of eating disorder**

Outcome	AN-R (N=20)		AN-BP (N=5)		BN-P (N=6)		BN-NP (N=7)	
	N	%	N	%	N	%	N	%
Remission	12	60	0	0	0	0	1	14.3
Good improvement	3	15	1	20	2	33.3	5	71.4
Slight improvement	3	15	1	20	1	16.7	1	14.3
No change	2	10	3	60	3	50	0	0



AN-R: Anorexia nervosa, restricting type  
 AN-BP: Anorexia nervosa, binge-eating/purging type  
 BN-P: Bulimia nervosa, purging type  
 BN-NP: Bulimia nervosa, nonpurging type

**Fig 1. Clinical course for the 38 patients**