Research Article

Night Eating Syndrome in Major Depression and Anxiety Disorders

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ABSTRACT

Introduction: The purpose of this study is to investigate the prevalence and the clinical features of night eating syndrome (NES) in patients with depression and anxiety disorders.

Method: The study was conducted at Bakırköy State Hospital for Mental Health and Neurological Disorders. Three-hundred out-patients who had major depression (MD), panic disorders (PD), general anxiety disorders (GAD) and obsessive-compulsive disorders (OCD) participated in the study. The semi-structured socio-demographic form, the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), Night Eating Questionnaire, and NES Evaluation Questionnaire were implemented.

Results: In our sample, the prevalence of the NES was 15.7% (n=47). NES frequency was significantly higher in the patients diagnosed with major depression (MD 22%, GAD 7.8%, OCD 12.5%, PD 14%). Smoking, presence of past suicide attempts, rates of antipsychotic drugs use, and average scores of body mass index (BMI) were significantly higher in the patients who had NES. In this sample, depression, BMI, and smoking were found to be determinants of NES.

Conclusion: This study shows that NES may be frequently observed in patients admitted to psychiatric clinics, especially in those with major depression. Evaluation of NES in psychiatric patients may help the treatment of the primary psychopathology and prevent the adverse effects, like weight gain, which may reduce the quality of life.
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Key words: Night eating syndrome, depression, anxiety, obesity

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Introduction

Night eating syndrome (NES) was defined by Stunkard et al. (1) in 1955 for the first time as a syndrome composed of the criteria of the lack of need for eating in the morning, eating excessively after diner, and insomnia. Few studies related to NES have been conducted in the 40-year period since its first definition was made. With obesity being a gradually increasing problem in the 1990s, NES became interesting for investigators. Studies in which NES was investigated were conducted using different diagnostic criteria in obese and psychiatric patients and in individuals with normal body weight (2,3,4,5,6,7,8,9,10).

NES was primarily investigated in obese patients, and it has been reported in to occur at a rate of 6%–16% in these patients in studies performed so far (11,12,13). In the general popula-tion, the prevalence of NES is estimated to be 1.5% (4,14). The fact that different criteria were used for the diagnosis of NES in studies performed in the past makes it difficult to determine the prevalence of NES. Recently, new diagnostic criteria have been recommended for the standardization of the diagnosis of NES (15).

In studies conducted on individuals with a diagnosis of NES, the syndrome was shown to be related to stressor factors and depressive mood (1,13,16,17,18,19). In a study conducted with obese patients, it was reported that depression scores are higher and self-esteem levels are lower in individuals with NES than in obese patients (13). In another study, it was reported that depressive mood in patients with a diagnosis of NES increases in the evening and night in particular (16). Allison et al. (15) reported that depressive mood in individuals with NES is typically

related to a lack of control on eating at night and feelings of guilt and shame accompanied in addition.

Considerably fewer studies related to NES have been conducted with patients presenting to psychiatric clinics. The prevalence of NEs has been reported to be 12.4% in psychiatry outpatients (10) and 25% in a sample composed of overweight or obese patients with schizophrenia, bipolar disorder, and depression (20). Recently, Palmese et al. (21) reported the prevalence of NES to be 12% in obese schizophrenia and schizoaffective patients. In another study in which patients with major depression and healthy participants were compared, the prevalence of NES was found to be 35.2% in the patients with major depression and 19.2% in the healthy controls (22).

Although studies suggest that NES is related to psychiatric complaints including depression in particular, our knowledge about this issue is considerably limited. The aim of this study was to examine the prevalence of NES and its clinical properties in patients with major depression and anxiety disorder.

Methods

The study population was composed of the patients who presented to the Outpatient Follow-up and Treatment Unit, Bakırkoy State Hospital for Mental Health and Neurological Disorders between December 2010 and May 2011. Approval was obtained from the local ethics committee for the study, and written informed consent was obtained from the patients who participated in the study.

The psychiatric diagnoses of the participants included in the study were evaluated by applying the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). As a result of the clinical interview, patients with a diagnosis of depressive disorder (n=131), panic disorder (n=49), generalized anxiety disorder (n=43), and obsessive-compulsive disorder (OCD) (n=77) were included in the study. Patients who had an accompanying psychiatric disorder, a neurological or psychiatric disorder related to medical diseases, previous or current alcohol and/or substance abuse and addiction, and who were on a diet for gaining or losing weight or who were fasting were not included in the study.

The clinical interview was conducted to differentiate NES from diseases including binge eating disorder and sleep-related eating disorder, and the diagnosis of NES was made according to the criteria recommended by Allison et al. (15) in 2010 (Table 1).

The heights and weights of the participants were measured after the interview. The measurements were taken after making the subjects take off their shoes. The body mass index (BMI) was calculated by dividing the weight in kg to the square of the height in m. Participants whose BMI was 30 kg/m^2 and above were considered obsessed, those whose BMI was between 25 and 29.9 kg/m^2 were considered overweight, and those whose BMI was below 25 kg/m^2 were considered normal.

Table 1. Diagnostic Criteria Recommended for Night Eating Syndrome

	Allison et al. (16) 2010
A.	Demonstration of a marked increase in daily eating regime in the evening and/or at night that occurs in one or both ways stated below:
A.1.	At least 25% of food intake occurs after dinner
A.2.	Eating after awakening at least two nights a week
B.	Being aware of and remembering eating episodes in the evening and at night
C.	Accompaniment of at least 3 of the following findings:
C.1.	Decreased appetite in appetite in the morning and/or not eating breakfast 4 or more days a week
C.2.	Presence of strong urge for eating between dinner and the onset of sleep and/or at night
C.3.	Sleep-onset insomnia and/or sleep-maintenance insomnia 4 or more times a week
C.4.	Presence of belief in the requirement of eating to go back to sleep or fall asleep
C.5.	Frequent depressive mood and/or worsening of mood in the evening
D.	The disorder leads to a marked distress and/or decrease in functionality
E.	Disruption in eating regime for at least 3 months
F.	This disorder has not developed secondary to any substance abuse or addiction, medical disease, drug usage, or other psychiatric diseases

Tools

The Sociodemographic Data Form: This form, which was prepared by investigators to evaluate the sociodemographic and clinical properties of the participants, includes questions on age; gender; socioeconomic status; life, familial, education, suicide attempt, alcohol-substance use, and non-psychiatric disease history; and and if any method was used to gain or lose weight.

SCID-I: This is a structured clinical interview form developed by First et al. (23) for DSM-IV Axis I disorders. Its Turkish adaptation and reliability studies were performed by Özkürkçügil et al. (24).

Night Eating Questionnaire: The Night Eating Questionnaire (NEQ) is a screening questionnaire developed for the diagnosis of NES. This questionnaire has questions hunger, food craving patterns, amount of calories gained after diner, sleeplessness and awakening states, hunger, presence of eating behavior at night, and mood. The current version is composed of 14 questions and the alpha value of the total score has been found to be .70 (25). The Turkish validity and reliability study of this questionnaire has not been performed. Permission was obtained from the original form for adaptation to Turkish and for use in our study. After the questionnaire was independently translated to Turkish by 3 translators who had a good command of

Table 2. Comparison of demographic properties, smoking, and alcohol consumption states and mean body mass index in the patient groups

	MD n=132 mean±SD	PD n=43 mean±SD	GAD n=77 mean±SD	OCD n=48 mean±SD	F	p
Age (years)	36.19±8.96	38.58±8.91	36.64±9.66	33.66±7.58	2.362	.07
BMI (kg/m²)	26.73±5.79	27.56±4.51	26.58±4.02	28.92±5.58	2.563	.06
	n (%)	n (%)	n (%)	n (%)	χ^2	p
Gender, female	108 (81.8)	30 (69.8)	54 (70.1)	31 (64.6)	7.451	.059
Marital status					9.870	.130
Single	28 (21.2)	3 (7.0)	19 (24.7)	15 (31.2)		
Married	92 (69.7)	36 (83.7)	54 (70.1)	31 (64.6)		
Divorced/widow	12 (9.1)	4 (9.3)	4 (5.2)	2 (4.2)		
Education status					5.360	.802
Primary school	74 (56.0)	27 (62.8)	39 (50.7)	26 (54.2)		
High school	35 (26.5)	11 (25.6)	25 (32.5)	14 (29.2		
University and above	23 (17.4)	5 (11.6)	13 (16.9)	8 (16.7)		
Smoking	60 (45.5)	21 (48.8)	36 (46.8)	13 (27.1)	6.301	.098
Alcohol consumption	25 (18.9)	6 (14.0)	10 (13.0)	4 (8.3)	3.562	.313

F: single-tail variance analysis; X2: chi-square test; MD: major depression; PD: panic disorder; GAD: generalized anxiety disorder; OCD: obsessive-compulsive disorder; BMI: body mass index

English, the translators made a consensus on a mutual text in terms of the translation's Turkish compatibility and comprehensibility. This text was translated back to English by a translator who did not know the original form. After the compatibility of the back-translated English questionnaire and original scale was determined, NEQ was considered to be applicable for the study. In this sample group, the Cronbach's alpha score of NEQ was found to be .71.

NES assessment questionnaire: This questionnaire was applied to the individuals diagnosed with NES in the study and was developed by investigators. It includes questions on the time of onset of NES, if there was any referral for a therapeutic objective, the relationship of NES with psychiatric diseases, drugs used for these diseases, time of eating in the evening or at night, presence of periodical findings during night eating, relationship of life stressors with NES, and presence of the same complaints in close relatives.

Statistical Analysis

In the assessment of findings obtained in the study, the Statistical Package for Social Sciences 18.0 (SPSS Inc., Chicago, IL; USA) program was used for statistical analyses. Descriptive statistical methods were used while evaluating study data. Student's t test was used in the comparison of qualitative measurements showing parametric distribution. In comparison of qualitative data, four-sided and multiple-sided chi-square tests were used; Fisher's exact test was used when necessary. Single-tail variance analysis was used in the comparison of qualitative measurements showing parametric distribution in more than two groups. Prospective logistic regression analysis was used for determining NES determinants in the study group. The results were evaluated in a 95% confidence interval and at a significance level of p<.05.

Results

A total of 300 patients [223 women (74.3%) and 77 men (25.7%)] were included in the study. The age distribution of the patients was between 19 and 75 years, and the mean age was found to be 36.25±9.00 years. Among the participants included in the study, 132 (44%) were found to have major depression, 77 (25.7%) had generalized anxiety disorder, 48 (16%) had OCD, and 43 (14.3%) had panic disorder. No significant difference was found between the patient groups in terms of demographic properties, frequency of smoking and consumption of alcohol, and mean BMI values (Table 2).

A diagnosis of NES was made in 47 (15.7%) patients who were included in the study in accordance with the recommended diagnostic criteria (15). Five (10.6%) of these patients who were diagnosed with NES consumed more than 25% of the amount of food they consumed in the whole day after dinner, 16 (34.0%) ate at least 2 nights a week after awakening, and 26 (55.4%) had both these features. The number of patients who looked for treatment because of NES in the past was 4 (8.5%).

Table 3. Comparison of the demographic and clinical properties of the patients who had and did not have a diagnosis of NES

	NES - n=253		NES + n=47			
	n	%	n	%	χ²	p
Gender					2.183	>.05
Female	184	72.7	39	83.0		
Male	69	27.3	8	17.0		
Psychiatric					8.295	<.05
Major depression	102	40.3	29	61.7		
Panic disorder	37	14.6	6	12.8		
GAD	71	28.1	6	12.8		
OCD	43	17.0	6	12.8		
Suicide attempt	53	20.9	17	36.2	5.134	<.05
Hospitalization	20	7.9	7	14.9	2.364	>.05
Use of antidepressants	208	82.2	39	83.0	.016	>.05
Use of antipsychotics	22	8.7	9	19.1	4.674	<.05
Use of D:D:D:	8	3.2	0	0	-	>.05
Presence of general medical conditions	29	11.5	5	10.6	.027	>.05
Smoking	95	37.5	34	72.3	19.574	<.001
Alcohol consumption	218	86.2	38	80.9	.895	>.05
Distribution of body mass index					5.365	>.05
Normal weight (<25 kg/m²)	97	38.3	12	25.5		
Overweight (25–29.9 kg/m²)	93	36.8	16	34.0		
Obese (>30 kg/m²)	63	24.9	19	40.4		
	Mean	SD	Mean	SD	t	p
Age (years)	36.97	9.25	36.27	9.36	-.473	>.05
Time of psychiatric disease	2.81	3.33	3.18	3.52	-.694	>.05
Body mass index (kg/m²)	26.92	5.45	28.84	5.50	-2.212	<.05

χ²: chi-square test; t: Student's t test; *Fisher's exact test; NES: night eating syndrome; SD: standard deviation; GAD: generalized anxiety disorder; OCD: obsessive-compulsive disorder

The mean time of NES was found to be 43.96±70.57 months (least=4, highest=240). The number of patients who stated that they had a stressor factor in their lives at the time of onset of NES was 32 (68.1%). The number of patients whose families included a member who had night eating was found to be 14 (29.8%).

The comparison of the properties of the patients who were and were not diagnosed with NES is summarized in Table 3. No statistically significant difference was found between the two groups in terms of mean age and gender distribution (Table 3).

The frequency of NES was found to be 22% (n=29) in the patients with depression patients, 14% (n=6) in those with panic disorder, 12.5% (n=6) in those with OCD, and 7.8% (n=6) in those with generalized anxiety disorder. The frequency of the diagnosis of major depression with the diagnosis of NES was significantly higher (X²=8.295; df=3; p<.05). No significant difference was found between the patients who were and were not diagnosed

with NES in terms of disease time and hospitalization states; the patients who were diagnosed with NES had a higher number of suicide attempts in the past (X²=5.134; df=1; p<.05) (Table 3).

No significant difference was found between the patients who had and did not have a diagnosis of NES in terms of the frequencies of antidepressant (X²=.016; df=1; p>.05) and antiepileptic (p>.05) usage; however, the frequency of antipsychotic usage was found to be significantly higher in the patients who had a diagnosis of NES (X²=4.674; df=1; p<.05) (Table 3).

No significant difference was found between the patients who had and did not have a diagnosis of NES in terms of the frequency of alcohol consumption (X²=.895; df=1; p<.05), whereas smoking was found to be significantly more frequent in the patients who had a diagnosis with NES (X²=19.574; df=1; p<.001) (Table 3).

The mean BMI was found to be 28.84±5.50 in the patients who had a diagnosis of NES and 26.92±5.5 in those who did not have a diagnosis of NES. The mean BMI value was found to be

Table 4. Night eating syndrome determinants in prospective logistic regression analysis								
Variables	B	S.E.	Wald	df	p	Probability rates	95%	Confidence interval
Model 1	Smoking (+)	1.453	0.351	17.155	1	<.001	4.277	2.150–8.508
Model 2	Smoking (+)	1.562	0.360	18.7876	1	<.001	4.768	2.353–9.663
	BMI	0.081	0.030	7.218	1	.007	1.084	1.022–1.250
Model 3	Smoking (+)	1.599	0.369	18.775	1	<.001	4.946	2.400–10.194
	Depression	0.961	0.346	7.714	1	.005	2.615	1.327–5.154
	BMI	0.088	0.030	8.516	1	.004	1.092	1.029–1.159

S.E. standard error; BMI: body mass index

significantly higher in the patients who had a diagnosis of NES (t=2.212; p<.05). No significant difference was found between the patients who had and did not have a diagnosis of NES in terms of BMI mean values (X^2=5.365; df=2; p>.05) (Table 3).

Forward ward logistic regression analysis was performed to determine NES determinants. The presence of NES was considered to be a dependent variable, whereas age, smoking, presence of a suicide attempt, psychiatric diagnosis, and BMI were considered to be independent variables. The model significantly predicted the presence of NES (omnibus X^2=34.39; df=3; p<.01). The results of the logistic regression are summarized in Table 3. Smoking, the presence of depression, and BMI were found to be significant determinants of the presence of NES (Table 4).

Discussion

In our study, the frequency and clinical properties of NES were examined in patients who had a diagnosis of depression and anxiety disorder. The frequency of NES was found to be 15.7% in the patients included in the study; it was found that NES was more common in patients with depression patients than in the other patient groups. In the patients diagnosed with NES, the rates of a previous suicide attempt, usage of antipsychotic drugs, smoking, and the mean BMI values were found to be significantly higher. Finally, the regression analysis performed to determine the NES determinants in the patients included in this study revealed that increased rates of smoking, presence of depression, and increased BMI values were significant determinants in the patient group in this study.

NES has been investigated from the time of its initial definition using different criteria in different samples including obese patients in particular (9,26,27). In our study, the criteria finally recommended were used with the objective of standardization (15). The frequency of NES was found to be 15,7% in the patients with major depression, generalized anxiety disorder, panic disorder, and OCD, and NES was found to be significantly more common in patient with depression. Studies conducted to date have reported that depressive complaints are observed commonly in individuals diagnosed with NES (13,16,17,18,19). In a study conducted with

obese patients, it was found that the scores of depression are higher and self-esteem scores are lower in individuals with NES than in the other obese patients (13). Calugi et al. (28) reported that NES is related to depression scores in class 2 and 3 obese patients. In another study, higher depression levels were found in individuals with NES than in healthy controls (16). de Zwaan et al. (29) reported the lifetime frequency of depression to be 56% in 106 participants diagnosed with NES. In the study by Lundgren et al. (30) in which non-obese patients with a diagnosis of NES were compared with healthy controls, the lifetime rate of unipolar depression in the participants with a diagnosis of NES was found to be 52.6%, and this was significantly higher than the healthy control group (9.1%). Considerably limited numbers of studies related with the prevalence of NES have been conducted in psychiatric clinics. Friedman et al. (31) found the frequency of NES to be 4.2% in 62 patients with seasonal affective disorder. In the study conducted by Lundgren et al. (10), alcohol/substance abuse is more common in individuals who met the criteria of NES, and no significant difference was found in terms of the frequency of other psychiatric disorders between patients who had and had not been diagnosed with NES. In another study conducted recently with individuals who had severe psychiatric disease, it was reported that a comparison was not made; because many patients were diagnosed with multiple Axis I diagnoses (20). In the study by Striegel-Moore et al. (4) conducted with a population composed of women, no difference was found between patients who had and had not been diagnosed with NES in terms of the lifetime frequency of Axis I psychiatric diagnoses. However, major depression constituted the most common diagnosis group in this study (30% of the women with NES). In another study in which patients diagnosed with depression were compared with healthy controls, the frequency of NES was found to be significantly higher in the patients who had a diagnosis of depression (35.2%) than in the control group (19,2%); it was reported that patients with depression patients are predisposed to NES with a 2.65-fold higher rate (22). The high rates of depression we found in the patients with depression in our study are similar to those in previous studies. In addition, the finding that the presence of depression was a determinant of NES supported the fact that there is a strong relationship between depression and NES.

It has been proposed that anxiety levels are higher in patients with NES than in other patients and that NES may occur following stressor factors (1,32,33). Lundgren et al. (30) reported that participants with NES are affected by stressor factors at a higher rate and had a lifetime frequency of anxiety of 47.4%. In two separate studies conducted with patients who had NES and binge eating disorder, higher anxiety levels were found in the patients who had NES and binge eating disorder in combination than in those who had only NES (34,35). In our study, the frequency of NES in the patients with anxiety disorder was found to be 14% in patients with panic disorder, 7.8% in the patients with generalized anxiety disorder, and 12.5% in the patients with OCD. In another study conducted with psychiatric patients, a significant difference was not found between patients with and without NES in terms of the frequency of anxiety disorder, similar to the findings of our study (10). The absence of sufficient number of studies related to the frequency of NES in patients with anxiety disorder makes it difficult to evaluate our results. In addition, the fact that the anxiety levels of the patients were not evaluated in our study limited our examination of the effects of anxiety on NES and the levels of anxiety in the patients with and without NES. Although the absence of a difference in anxiety disorders between the patients with and without NES suggested that these disorders do have an effect on NES as much as depressive mood, the rate we obtained showed that NES was observed with a considerably high frequency in these patient groups.

When the differences in psychopharmacological therapies used by the patients in our study were evaluated, no difference was found between the patients with and without NES in terms of the frequency of usage of antidepressant or antiepileptic drugs. The rate of patients who used antipsychotic drugs was found to be significantly higher in the patient group with NES. In the study conducted by Lundgren et al. (10) with psychiatric patients, it was found that the rate of the usage of only antipsychotic drugs was significantly higher in the patients with NES. Psychopharmacological drugs have effects on hunger and appetite (36), and it is known that many antipsychotic drugs including clozapine and olanzapine may lead to excessive eating and thus, weight gain (37). Therefore, the use of an antipsychotic drug may be a risk factor for the occurrence of NES. The fact that there is a limited number of studies related to the frequency of NES and the relationship of NES with psychiatric disorders makes it difficult for us to evaluate the effects of psychopharmacological treatment on NES. Further studies examining the relationship between the use of psychopharmacological drugs and NES are needed.

In our study, the lifetime rate of suicide attempt in the patients with NES was found to be significantly higher than in the other patients. The fact that depression was more frequently observed in the patients with NES suggested that tendency to commit suicide is observed at a higher rate. In addition, it is known that sleep-onset insomnia and sleep-maintaining insomnia accompany NES (8,12,15,33,38,39). Studies have found that the presence of sleep disorders is related to suicide behavior in patients with major depression (40) and that disruption in sleep quality increases the risk of suicide (41). The fact that sleep disorders accompany psychopathology in patients with NES suggests that the risk of suicide is increased.

Results obtained in studies show that NES is more frequently observed in obese individuals than in the general population (12,13,26,42,43). However, the fact that majority of studies related to NES have been conducted with obese or overweight patients makes it difficult to determine the relationship between obesity and NES. In some population-based studies, no significant difference was found between individuals with and without NES in terms of mean BMI values and frequency of obesity (4,14,19,44,45). Similarly, no relationship was found between NES and BMI in a study conducted on patients with a diagnosis of depression (22). In our study, the mean BMI value was found to be significantly higher in those with NES than in those without NES. In the whole patient group, the mean BMI value was found to be a significant determinant of NES. Although our findings contrast the studies mentioned above, they show similarities with other studies (43,46). In the study of Colles et al. (46) conducted with normal-weight and obese patients, a significant positive correlation between NES and increase in BMI was found. The authors proposed that the fact that this correlation was not found in previous studies arose from the investigation of NES in homogeneous populations and narrow body weight ranges. In another study conducted with psychiatric patients, the mean BMI values in patients with NES were found to be significantly higher than those of the patients without NES (10). The low level of NES frequency in population-based studies and narrow weight ranges in studies conducted with obese patients as reported by Colles et al. might have led to contradictory findings related to the relationship between BMI and NES. The finding obtained in our study shows that there is a relationship between NES and BMI and that father studies are needed to evaluate if this relationship is specific for a group or it is a general finding.

In our study, smoking was found in a significantly high rate in the individuals with NES. In addition, smoking was found to be one of the determinants of NES. It has been reported that smoking as well as alcohol-substance abuse are common in eating disorders (47,48,48,50). Lundgreb et al. (44) found that smoking is significantly common in individuals with night eating (51.4% in individuals with night eating and 40.2% in individuals without night eating). Nicotine increases energy consumption in the short term and may decrease the appetite. However, in heavy smokers, decreased physical activity, poor diet, and smoking itself may lead to weight gain (51). In addition, it has been stated that nicotine increases calorie intake during eating (52,53). It may be thought that smoking in patients with NES leads to a decrease in nutrition quality, increase in weight gain, and an increase in night eating. Increased smoking in patients with NES is notable and should be examined in further studies.

The definition of NES and diagnostic evaluation of NES con-

stituted the most important limitation of our study. In our study, the final diagnostic criteria recommended for the standardization of the diagnosis of NES were used (15). The fact that different diagnostic criteria were used for the diagnosis of NES in the past in many studies makes it difficult to compare the results we obtained with those of other studies. Another limitation of our study was the fact that no scale was used to evaluate the severity of clinical symptoms including depression and anxiety. The fact that our sample size was not large enough and was composed of only patients who were diagnosed with NES constitute other factors that limit the generalization of our results. Studies comparing healthy controls with psychiatric patient groups are needed.

Despite all this limitations, our study is one of the limited numbers of studies conducted with the psychiatric patient group and included important findings related to the relationship between NES and psychiatric complaints. It can be stated that NES is commonly observed in patients presenting to psychiatric clinics, including patients with major depression in particular. NES should be evaluated in patients presenting to psychiatric clinics, and factors including psychopharmacological therapies and weight gain, which may be related to NES, should be addressed. The recognition of NES in psychiatric patients and the consideration of NES in treatment planning will help prevent factors including weight gain, which may arise from NES, that may decrease the quality of life.

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