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Eating Disorders with Comorbid Anxiety Disorders

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<http://dx.doi.org/10.5772/65844>

Abstract

Although eating disorders and anxiety disorders (AD) are under different diagnosis categories, it is striking that they have high comorbidity and similar clinical features. The most frequently informed anxiety disorders are obsessive-compulsive disorder (OCD), social anxiety disorder (SAD) and generalized anxiety disorder (GAD). Moreover, in cases with a tendency of perfectionism, concern and harm avoidance before the diagnosis of eating disorder, the anxiety disorder is able to be failed to notice. The existence of anxiety disorder or eating disorder makes these syndromes worse. Until today, the relation in between eating disorder and AD has tried to be clarified by phenomenological, neurobiological and family studies. But even if a significant relation has been specified in phenomenological aspect in between OCD and eating disorders, the relation in between eating disorders and other AD is not clear. The existence of AD may be a risk factor in the arise of eating disorders. Therefore, diagnosis and treatment of childhood-adolescence occurring AD may prevent the development of eating disorders. The comorbidity of eating disorders and AD is negatively affecting the treatment and prognosis of the disorder. Moreover, there is limited evidence regarding the effectiveness of treatment options (medication, cognitive behavioral therapy (CBT), family therapy, dialectic behavioral therapy, interpersonal therapy) used in the treatment of cases with a diagnosis of concurrent eating disorder and anxiety disorder. In this chapter, a review of the literature on the comorbidity between eating disorders and the anxiety disorders of OCD, posttraumatic stress disorder (PTSD), SAD, GAD, simple phobia, agoraphobia and panic disorder.

Keywords: eating disorders, anxiety disorders, comorbidity

1. Introduction

Psychiatric comorbidity is defined as coexistence of more than one psychological disorder. In many studies made until today in the field of mental health, high psychiatric comorbidity rates have attracted attention [1–3]. In the case of psychiatric comorbidity, the existence of the second disorder causes more and longer hospitalization, acute state-flaming up and late response to treatment. The comorbidity of eating disorders—which have the highest risk of early death among the mental disorders—and other mental disorders has been examined in many studies [4–6]. Attention has been drawn to high comorbidity rates of especially mood disorders, personality disorders and substance abuse with eating disorders [7]. The psychiatric comorbidity is important in individuals with eating disorder. Because the symptoms of eating disorder may intensify in the existence of psychiatric comorbidity, the symptoms may become chronic and the treatment compliance of the patient may spoil. And the high mortality rates in eating disorders may be explained by this condition. For this reason, early diagnosis and treatment of other mental disorders that coexist with eating disorders will affect the course of the disorder. Although it has been reported until today by many researchers that anxiety disorders exist for once or more in the lives of about two-thirds of the individuals with eating disorder, the information regarding comorbid anxiety disorders in individuals with eating disorder is not sufficient and clear. Having significant methodological problems in studies made on this subject is making the results of the studies questionable. The selection of cases, the diagnostic criteria used and different diagnosis tools, lack of control groups with small samples and lack of preference of suitable statistical methods are among the most significant constraints of the studies. But as specified by most of the researchers, the highness of the prevalence of AD in cases with eating disorder shouldn't be forgotten. Until now, the most frequently existing anxiety disorders in cases with eating disorder are OCD, SAD and GAD, respectively. Due to the similar and coinciding symptoms of obsessive-compulsive disorder and eating disorder, it has been alleged that both mental disorders may have a common etiology. Frequent existence of both eating disorders and anxiety disorders in females and among close family members supports common genetic tendency. Although it has been informed in the studies that all the anxiety disorders are of similar rates in individuals with anorexia nervosa and bulimia nervosa diagnosis, there are conflicting results regarding which specific anxiety disorder exists the most in the sub-types of eating disorder. The studies have been mostly carried out on the individuals with anorexia nervosa (AN) and bulimia nervosa (BN) diagnosis. Eating Disorders Not Otherwise Specified (EDNOS) and binge eating disorder—which frequently exist in routine clinical implementations—have been omitted in studies made on this subject. In other words, the subject of anxiety disorders with comorbidity EDNOS and binge eating disorder has nearly never been included in the studies as different from other eating disorders. On the other hand, the prevalence of comorbid eating disorder in individuals with anxiety disorder is not clearly being known. Moreover, the information regarding the treatment approaches in the existence of comorbid anxiety disorder in individuals with eating disorder is limited. In this section, the subject of comorbidity of eating disorders and anxiety disorder has been addressed, and it has been intended for them to be discussed in light of the current literature information. From accessible studies in the literature about eating disorders

and comorbid AD, case selection criteria based on the diagnostic classification, the scale used in the diagnosis, the study in the control group, are included in this section: the diagnostic criteria for eating disorders and AD, diagnostic scale is not used, no control group of studies were excluded.

2. The comorbidity between eating disorders and anxiety disorders

The relation in between eating disorders and anxiety disorders has attracted the attention of the researchers for many years, and the phenomenology of anxiety and eating disorders has been examined in three perspectives until today. First, the similar clinical manifestations of eating disorders and anxiety disorders have been defined. For instance, it has been specified that there is a parallelism with OCD and cramming type of eating/vomiting periods in bulimic patients or eating rituals of anorexic patients. Second, by the studies which had covered the society and the clinical samples and which had been applied on females with eating disorder, high rates of anxiety disorders have been determined in the families of the cases. Third, in both of the CBT and pharmacological treatment approaches, it has been informed that it is effective also in the eating disorders (i.e., exposure and response prevention and fluoxetine in patients with BN) as well as the anxiety disorders [8, 9]. All these results indicate that there may be a relation in between the eating disorders and anxiety disorders. Because until today, it has been informed in many studies that the comorbidity of eating disorder and anxiety disorder exists extensively. Swinbourne et al. [10], in their study performed with 100 cases being subjected to inpatient treatment due to eating disorder and with 52 cases being treated with the diagnosis of anxiety disorder, had searched the prevalence of the comorbidity of eating disorders and anxiety disorders. In that study, the authors had determined that at least one comorbid anxiety disorder was existing in 65% of the cases being treated due to eating disorder, and that the anxiety disorder was existing before the diagnosis of eating disorder in 69% of them. The anxiety disorder diagnosis of the cases had been social anxiety disorder (42%), posttraumatic stress disorder (26%), generalized anxiety disorder (23%), obsessive-compulsive disorder (5%), panic/agoraphobia (3%) and specific phobia (2%), respectively. In the same study, it had been informed that comorbid eating disorder was existing at a rate of 13.5% in the patient group being treated due to anxiety disorder, and that eating disorder had developed after anxiety disorder in 71% of these cases [10]. The results of this study make us think that the prevalence of comorbidity of eating disorder and anxiety disorder is high. For this reason, it is required to develop clinical understanding regarding comorbidity in between eating disorders and anxiety disorders. It is required to address both mental disorders together in the clinical evaluation and treatment programs of eating disorders and anxiety disorders.

And in another study searching the relation in between anxiety frequency and eating disorders and anxiety disorders in individuals with anorexia nervosa and bulimia nervosa, the Structured Clinical Interview for DSM-IV Axis I disorders had been used. Ninety-seven cases with anorexia nervosa, 282 cases with bulimia nervosa and 293 cases with both anorexia nervosa and bulimia nervosa had been included in the study, and they had been compared with nonclinical group of women in the society. According to this, the rates of anxiety disorder in

sub-types of eating disorders were similar. One or more AD has been determined along their lives in two-thirds of the individuals with eating disorder. The most frequently existing anxiety disorders are obsessive-compulsive disorder (N = 277 [41%]) and social phobia (N = 134 [20%]). Most of the participants had informed that OCD, social phobia, specific phobia and generalized anxiety disorder had started in their childhood, and that eating disorder had developed afterwards. Again in the study, attention had been drawn to the point that the ones who have eating disorder history and who are not diagnosed with anxiety disorder have tendency of perfectionism, concern, timidity and harm avoidance. The authors had specified that these syndromes may intensify in case of existence of eating disorder or anxiety disorder [11]. The results of this study have similar qualification with the results of the studies made regarding the subject. In other words, the frequency of anxiety disorders (especially OCD) in the individuals with eating disorder has been found to be higher compared with nonclinical group of women in the society. The starting of anxiety disorders before the eating disorders supports the view that anxiety disorders may be a risk factor for the development of eating disorders.

In between 1985 and 2002, Godart et al. [12] had examined all the researches searching the eating disorders with comorbidity anxiety disorders. In that study, answers had been sought for the following three questions: (1) Is there any convincing evidence regarding the anxiety disorders in women with eating disorders are existing more frequently compared with the women in the general society? (2) What are the convincing evidences regarding that there is a difference among the sub-types of eating disorders that are informed to exist along with the sub-types of anxiety disorders? (3) What is the chronology regarding the arise of both disorders? Through the studies made in different societies, the authors had specified that an increased risk had been indicated for anxiety disorders in individuals with eating disorders. In addition, studies with conflicting results had also been specified in the same study, and attention had been drawn to procedural limitations in the formation of diagnosis groups in which the control group was also included [12]. The answers of the above questions are not clear even today.

In a study with a sample group of French patients with eating disorder, the prevalence of anxiety disorders along the life and starting age of eating disorders had been searched. Sixty-three cases included in the study had been assessed by Composite International Diagnostic Interview (CIDI) and DSM-IV. It had been determined that anxiety disorder arises at least once along the life in 83% of the patients with anorexia nervosa and in 71% of the patients with bulimia nervosa. The most frequently existing one is social phobia (55% of the anorexics and 59% of the bulimics). In 75% of the patients with AN, and in 88% of the patients with BN, it had been informed that the anxiety disorder had started before the eating disorder. These results are in conformity with the studies performed in other countries. Again, the authors had specified that comorbid anxiety disorders should be considered in order to succeed in the treatment of eating disorder [13].

In the study of the same study group performed in 2003 in which 271 French women patients with anorexia nervosa and bulimia nervosa and the control group consisting of 271 healthy women had been compared, it had been determined that at least one anxiety disorder had existed in 71% of the group with eating disorder. This rate is higher than the rate of anxiety

disorder in the healthy control group. Again in that study, the prevalence of many of the types of anxiety disorders had been found to be higher compared to the control group with eating disorder. In 53.3% of the cases with eating disorder, the anxiety disorder exists before the start of eating disorder [14]. The results of this study supports the fact that the anxiety disorders are more frequently existing in cases with eating disorders compared with the general society, and they point out that both disorder may have common etiology and treatment approaches.

Perderea et al. [15] had searched the history of anxiety and mood disorder in the families of cases with anorexia nervosa. According to this, the authors, who had examined the studies performed on this subject in between 1980–2006, had informed that the studies had significant methodological problems and that it is not possible to reach a conclusion with the current studies.

Blinder et al. [4] had searched the DMS-IV Axis 1 comorbidity on 2436 women patients with the diagnosis of anorexia nervosa and eating disorder—not otherwise specified—who were inpatients, had determined the existence of a comorbid mental disorder in 97% of the cases. In that study, attention had been drawn to the fact that 56% of the cases had anxiety disorder. Although there was no difference in between the rates of anxiety disorder comorbidity in the sub-types of eating disorder, the comorbidity of OCD and posttraumatic stress disorder (PTSD) had been found to be statistically significantly different. It had been determined that two times more OCD was existing in cases with AN-BN (anorexia nervosa, binge-eating/purging type) and AN-R (anorexia nervosa, restricting type) diagnosis compared with the patients with BN and EDNOS. The findings of other studies—informing that OCD is being observed at an higher rate in cases with AN cases compared with BN cases—are similar [16–18]. Only in one study, higher OCD comorbidity had been informed in cases with BN compared with the cases with AN [11]. These consistent findings, regarding the association of OCD and eating disorders, are casting a light on the fact that the symptoms of OCD and eating disorders coincide. It is striking that smudge obsession and cleaning or hand-washing compulsions are more frequently being observed in cases with eating disorder. When the future studies are performed considering the OCD symptom groups, it will enable us better to understand the comorbidity of OCD and eating disorders.

The differences in the prevalence rates of comorbid anxiety disorders in cases with eating disorder are striking. Moreover, the studies had mostly been performed with female patient groups, and the rates relevant to male patients are not clear. Again the rate of existence of anxiety disorder in adolescent patients with eating disorder is not clearly being known. Thus, studies with wide samples in which the age and gender groups in different societies are being compared with control groups are required.

3. Obsessive-compulsive disorder (OCD)

Even if the OCD and eating disorders are under different categories, the studies have revealed that both disorder groups have some common cognitive, behavioral and personal features. Especially in the recent decades, it had been concentrated by the researchers on the close

relation of these two disorder groups. AN is the first eating disorder scheme that is being associated with OCD due to its clinical features such as rigid diet programs, ruminations relevant to food, repeated weight measurements and continuous calories calculations [19]. For the first time, Palmar and Jones had specified by their study on four cases that the patients with AN may be assessed as OCD (the exteriorization of a compulsion neurosis) in respect of personal traits. They defended this thesis by the fact that the individuals with AN are always being interested with weight and food, and that they exhibit stereotypic and ritualistic behaviors during their diets, exercises and weight follow-ups [20]. As informed by Karayilan and Erol, DuBois had also defined AN as 'cachectic compulsion neurosis' in a similar manner [21]. Rothenberg (1986), 'a modern obsessive-compulsive syndrome' by defining the form of AN has noted may be a form of obsessive-compulsive disorder [22]. In clinical samples, in cases with AN-R, the prevalence of OCD along the life is varying in between 9.5–62% [23, 24]. And the prevalence of OCD along the life in cases with AN-BN is varying in between 10–66% [25, 26].

In a study performed as comparing with the control group, the prevalence of OCD in cases with AN had been found higher compared with the control group [27]. And for BN, the prevalence of OCD along the life had been informed to vary in between 0–42% [13, 26]. And in a study performed by comparing with the normal control group, the frequency of existence of OCD in ones having BN history either currently or in the past had been found to be higher compared with the control group [28]. But Bushnell et al. [29] had specified that there is no difference in the existence of OCD in cases with BN. In the studies comparing the OCD rates in cases with AN and BN, attention had generally been drawn to high OCD comorbidity in cases with AN. In addition, in two studies performed in Japan, higher OCD comorbidity had been informed in cases with BN [17, 30]. Matsunaga et al. [30] had specified that there are more severe mood symptoms in BN cases with OCD comorbidity compared with the BN cases without OCD comorbidity. And the qualification of the OCD symptoms in patients with eating disorder had also been searched. For instance, Fahy [31] could not find any difference in respect of obsessive-compulsive symptoms in the categories of control, suspicion, cleanliness and rumination in between the OCD groups with and without AN comorbidity, but he had indicated that obsessive-compulsive symptoms related to eating and being weighed are more prevalent in AN comorbid OCD group. And in another study, while the most frequent existing OCD symptoms were being classified as 'symmetry and order' and 'cleanliness and washing,' respectively, in AN comorbid OCD patients, they had been determined as 'cleanliness and washing' along with 'obsession and control' in patients only with OCD [32]. Matsunaga et al. [33] had determined in another study by which they had scanned the primary OCD symptoms in OCD comorbid bulimic patient group that the most prevalent symptoms were symmetry-order obsessions and controlling and arranging compulsions, and that the smudge and aggression obsessions and cleaning-washing compulsions were the secondary ones.

Bastiani et al. [34] had determined that the OCD symptoms in anorexic patients were related to 'symmetry and order,' and they had informed that the controlling compulsion of the OCD patients—consisting this comparison group of the study—was significantly higher than the AN patients along with having an extensive obsessive-compulsive symptom range.

Thiel et al. [35] had indicated that the aggressiveness obsession and controlling compulsion were being more frequently observed in patients with eating disorder, and that in the patients with the eating disorder with comorbidity OCD, symmetry obsession and arranging compulsion were more prevalent. In many studies performed relevant to eating disorder and OCD comorbidity, it had been specified that OCD starts much before the diagnosis of eating disorder [16, 36].

Fahy et al. [31] had compared the patient with OCD group with AN comorbidity with a group only with OCD in respect of starting age of disorder and had determined that the starting age of obsessive-compulsive symptoms was significantly earlier in the AN comorbid OCD group compared to the group only with OCD (average starting age of OCD 17.4 and 22.1, respectively). Again in the same study, it had been shown that the symptoms of obsessive-compulsive and eating disorder were starting nearly at the same ages in the comorbid group, and these results had been interpreted by the authors that the OCD development in late adolescence period—in which the young women are more sensitive about weight—increases the possibility of development of AN as being focused at their concerns on that point. OCD may be a risk factor for the development of eating disorder or the eating disorders, and OCD may have common neurobiological, genetic and psychological etiology. For this reason, one of the reasons being suggested in order to understand the relation of both disorders is the role of brain's serotonin activity's dysregulation in the pathophysiology of these disorders.

Considering the data of response to mediation, results of peripheral symptom study and pharmacological stimulation tests Jarry and Vaccarino [37] had concluded as follows: while the increase in the serotonin functions is increasing the primary OCD symptoms (avoidance behaviors such as washing, controlling), the lowness in the functions of serotonin is relevant to impulsivity and improper thoughts. In this text, it has been emphasized that the irregularities of serotonergic system contribute to cognitive model causing bipolar typical OCD behaviors as OCD is a thought disorder. The studies relevant to the functionality of serotonergic system in eating disorders had mostly been performed with the restrictive AN patients. Kaye [38] had found the peripheral 5-HT symptom level low in AN patients with low body mass index (BMI) and had revealed that the level of 5-HT turns to normal by correcting the weights of these patients. When the serotonin levels are considered after a long while after correcting the weights of patients with AN-R, it had been determined that they were higher compared with the AN-BN individuals with corrected weight, BN individuals and normal individuals [39].

Milos [40] had emphasized that the view of 'OCD is the result of hunger and of having low weight in AN disorder' was being supported by relating the severe thinness as the reason of distortion in the brain's serotonin activity and of increase in OCD symptoms. Based on these findings, it is being alleged that the irregularity in the serotonin functions is causing similar thought and behavior disorders in ED and OCD. Moreover, both disorders are relevant to the serotonin receptor system. Considering that the appetite is being regulated with the 5-HT_{1A}, 5-HT_{1B} and 5-HT₂ receptors, and anxiety is being related to the 5-HT_{1A}, 5-HT₂ and 5-HT₃ receptors, interaction of common receptor may be in subject in the arise of eating disorder and OCD symptoms [37]. In cases with eating disorder, OCD is negatively affecting the prognosis

of eating disorder. Matsunaga et al. [30] had indicated that the psychopathology was more severe in respect of negative effect and core eating disorder symptoms in BN patients with comorbidity OCD compared to the ones without OCD. Matsunaga et al. [32] had informed that the comorbidity of OCD was causing more distortion in functionality in AN patients and increases in hospitalization rates, and had related the existence of OCD or obsessive-compulsive personality disorder (OCPD) in AN patients with severity of strain in socialization, depression and anxiety.

Thiel et al. [35] had monitored the patients with eating disorder for 30 months and had searched the effect of the existence of OCD on the results of the treatment, and they had concluded that the comorbidity of OCD doesn't significantly affect the prognosis of AN and BN. The results of a multicentered-extensive study performed by Sallet et al. [41] on the patients with OCD had shown that comorbidity of eating disorder is related to more severe obsessive-compulsive clinical symptoms, starting of compulsion at earlier ages, increase in the other axis I comorbidity, higher levels of depression and anxiety symptoms and higher suicidal attempts in these patients. When examined in respect of treatment, there are many studies proving that both the OCD and eating disorder patients respond to the selective serotonin reuptake inhibitors (SSRIs). In the pharmacology guide for anxiety, OCD and PTSD of world biological psychiatry associations' federations, fluvoxamine, sertraline and fluoxetine are being suggested primarily [42]. Kaye et al. [43] had found fluoxetine effective on restrictive AN cases in one of their studies, and in another study [44], they had indicated that fluoxetine is preventing the relapses in patients with AN.

Romano et al. [45] had determined that fluoxetine is beneficial in both the acute and chronic periods of BN disorder. Even if there is a common clinical manifestation in between the eating disorders and OCD, there are some differences. One of the most significant differences in between the OCD and eating disorders is that there is an extensive obsessive-compulsive range in cases with OCD besides the eating disorder. The compulsions decrease the anxiety in cases with OCD, and bulimic and restrictive behaviors in eating disorders function as affect regulation [46].

The extensive comorbidity rates in between eating disorder and OCD had directed the researchers to phenomenological studies in order to better understand the connection in between these two disorders. The researchers, examining the clinical features and personal traits of patients with OCD and eating disorder, had tried to explain the relation of obsessive-compulsive personality disorder by many hypotheses. Most of the patients with AN involve in decreasing the food intake, distinct activity on the body, compulsive calorie calculation along with continuous rumination relevant to food, excessive exercise and use of laxatives depending on obsessive nature of thinness in respect of clinical features [32].

The anorectics are stereotypically defined as rigid, ritualistic, perfectionist and meticulous in respect of their personality structures [35, 47, 48]. Perfectionism is the leading feature of eating disorders, and it may sometimes begin before the development of eating disorder, or it may arise as a distinct characteristic in the acute period of eating disorder, and it may even continue after treatment of eating disorder [49]. In the studies performed, the AN and BN patients tend to get higher scores in scales relevant to perfectionism compared with the healthy controls [35,

48, 50]. Kaye [51] had emphasized that the individuals with AN and BN are in conformity with perfectionist personality structure. The obsessive personality trait had been determined at higher rates in individuals with OCD and eating disorder [52].

In a retrospective study, it had been determined that patients with AN-R and AN-BP have obsessive personality structures at rates of 76 and 57%, respectively, in respect of premorbid personality traits [53]. As there are ones who allege that the obsessive-compulsive symptoms in eating disorder patients constitute a risk factor for the development of eating disorder [54, 55], there are also ones who defend that these symptoms are being exhibited as secondary phenomenon of eating disorder [56]. In the personality disorder prevalence studies performed among patients with AN, the obsessive-compulsive personality disorder (OCPD) ranks the first, and its rate is in between 17–60%. But the rate of comorbidity of OCPD and OCD is lower than expected, 6–28%. There are researchers who deem the distinctiveness of obsessional personality traits in patients with AN as the cause of development of OCD in these individuals [32]. On the other hand, the effect of prevalence of comorbid eating disorders in cases with OCD on the treatment and course of disorder is not completely being known. There are very limited studies on this subject. Tobiassen [57], in his study performed by 93 patients with a primary diagnosis of OCD, had determined higher rates of eating disorders in cases with OCD compared to the healthy group. In the same study, it had been specified that the eating disorders don't affect the treatment of cases with OCD with a higher eating disorder rate among female patients group compared with the male patients. Moreover, it has been reported that eating disorder symptoms of the cases with OCD had not decreased significantly after treatment. Until today, most of the researches had focused on the comorbid OCD in cases with eating disorder. For this reason, the future studies will search the answers of these questions.

After all, although the eating disorder and obsessive-compulsive disorder are involving as different diagnosis categories in DSM-5, their similarity in respect of high comorbidity rates and personality traits is attracting the attention of the researchers. While the obsessive and perfectionist personality traits are creating tendency for the development of OCD and eating disorder, the existence of obsessive-compulsive symptoms may be risk factor for eating disorder. The relation in between eating disorder and OCD has tried to be clarified through phenomenological, neurobiological and family studies. In phenomenological aspect, there is a significant connection in between these two disorders, but it is not possible yet to explain this connection by data regarding that it is serotonergic irregularity or hereditary tendency. The condition of OCD and eating disorder comorbidity is negatively affecting the prognosis of the primary disorder. Even if the symptoms in eating disorder relevant to diet, weight and compensative behaviors are ones similar to obsession-compulsion, the results of the current researches are not sufficient for the eating disorders to be deemed as OCD or for them to be called as variations of OCD.

4. Generalized anxiety disorder (GAD)

The relation of eating disorder and comorbid GAD had not been sufficiently searched. This subject had been addressed in a few studies. In two clinical studies, lifetime prevalence of GAD

in cases with AN-R had been found 24 and 31% [13, 24]. In both studies, the rate of GAD had been determined higher than the healthy control group. But in a study, the comorbid GAD rate in cases with AN had been determined as different from the control group [58].

Walters and Kendler [59] had determined the comorbidity of GAD in cases with AN as 6.1 times more compared with the control group. In a recent clinical study performed in 2008–2012 in Sweden with an extensive sample, it had been informed that the highest psychiatric comorbidity in eating disorder cases is anxiety disorders (53%), and that GAD comes the first among anxiety disorders [60]. In the studies, the comorbidity of GAD and BN had been searched, and lifetime prevalence of GAD in cases with BN had been informed as in between 10 and 55% [61, 62]. As different from these studies, there are also studies which specify that there is no difference [24, 28, 62]. Kaye et al. [11] had informed by their studies that the comorbid GAD rate in cases with AN and BN is lower than the high rates such as 45.6 and 31.4% which had been informed by the studies of Godart et al. [14] (13 and 7%). Iwasaki et al. [17] had reported the rate of ones meeting the GAD diagnosis criteria in cases with AN and BN as 13%. In this study, it had attracted attention that GAD is generally more frequent in purging subtypes of both AN and BN even if not statistically significant. In a study, it had been alleged that GAD starts in childhood period in 75% of the female cases with BN, and the existence of GAD may be a risk factor in the development of BN [63]. These results support the fact that there exists anxiety disorder before the start of eating disorder in women with BN. Konstantellou et al. [64] had compared two groups with and without GAD diagnosis with the healthy control group. As the result of that study, attention had been drawn to the fact that the ones with eating disorder and comorbid GAD diagnosis have higher concern and avoidance scores than the other two groups. The authors had informed that there may be a common cognitive model in between eating disorder and GAD. The comorbid psychiatric disorders in adolescents with eating disorder and differences as per genders had not been sufficiently searched. Sidor et al. [65], in their study with extensive sample in which they had compared the female and male adolescents with eating disorder, had informed that the generalized anxiety rates were similar for both genders. Consequently, it is required to search in more detail the relation of GAD—being one of the most frequently existing anxiety disorders in the society—and eating disorders.

5. Posttraumatic stress disorder (PTSD)

The relation in between eating disorders and trauma has attracted the attention of the researchers. It had especially been dwelled on the subject that the childhood period traumatic stories such as childhood sexual abuse may be risk factor for the development of eating disorder [66–68]. But surprisingly the eating disorder and comorbid PTSD had been addressed in a few studies until today [69]. And in a study in which the comorbidity relevant to all the anxiety disorders had been searched in cases with eating disorder, PTSD had not even been included in the assessment [13]. In studies searching the comorbidity of PTSD in cases with eating disorder, the rate of PTSD is varying in between 11–52% [70, 71]. In a study with three clinical samples, the lifetime PTSD prevalence in cases with BN had been reported as 3% [72],

10% [62] and 30% [24]. In a study, higher rates of eating disorder had been informed for the women subjected to sexual abuse than the ones who are not subjected to it [73]. The results of this study are in conformity with the results of other studies informing that more frequent PTSD, mood disorders, substance abuse disorders, eating disorders and sexual disorders are being observed among women subjected to sexual abuse [74–76]. In a study with clinical samples, it had been informed that the diagnosis criteria of PTSD had been met in 25% of the cases with eating disorder [77]. Vierling et al. [78] had informed that there was a PTSD prevalence at a rate of 33% in the small sample patient group with eating disorder, and that there was no difference among the sub-groups with eating disorder. In the same study, it had also been emphasized that the comorbidity of PTSD has negative effects on the course of eating disorder (by reasons such as frequent problems among people, impulsivity). In adult Swedish cases having history of traumatic exposure (N = 843, mean age 27.2, 97.3% female) being followed up with the diagnosis of eating disorder, the rate of lifetime PTSD diagnosis had been determined as 24.1%. In this study, it had been informed that the diagnosis of PTSD increases the severity of eating disorder, and that the symptoms of eating disorder start within one year following the trauma [79]. Becker et al. [80], in their studies with clinical samples having eating disorder, had obtained results supporting the relation in between PTSD and eating disorders, because child sexual assault (CSA) may play a significant role in the pathology of eating disorders (specific eating disorder symptoms, specifically, bingeing, vomiting and negative body image). In a meta-analysis study performed by Smolak and Murnen [81], a relation had been found in between CSA and eating disorders. The authors had indicated that the symptoms of eating disorder increase along with CSA. In a similar manner, Jacobi et al. [82] had also specified the relation of sexual abuse and eating disorders. There are also studies informing that there is no relation in between CSA and eating disorders [83, 84]. Moreover, the rates provided in the studies for prevalence of childhood sexual abuse are very different. The reason of it is the use of different methods in the studies. In the studies searching for the comorbid PTSD rates in the sub-types of eating disorders, higher PTSD comorbidity had been informed in cases with BN [85, 86]. And in another study, three times higher PTSD comorbidity had been reported in cases with BN compared with cases with AN [11]. Only in one study, PTSD comorbidity had been informed in 8% of the cases with AN-R, and it had been specified that rate was not different from the control group [24]. Blinder et al. [4] had informed two times more PTSD diagnosis in cases with AN-BP (in women with binge/purge) compared with the cases with AN-R, BN and EDNOS. In a similar manner, the child sexual abuse had been found higher in female cases with AN-BP compared with the female cases with AN-R [87]. In ones with childhood sexual trauma history, especially bingeing and purging behaviors, may assist with affect, emotional regulating. Consequently, it is required to examine in more detail the relation of eating disorder and PTSD.

6. Simple phobia

In the studies performed until today, regarding the comorbid simple phobia in cases with eating disorder, it had been informed in between rates of 0–34% for ones with AN, and in

between rates of 10–46% for ones with BN [13, 62]. Lilenfeld et al. [24], in their study in which a healthy control group was used, had concluded that there was no difference at the rate of comorbid simple phobia in cases with AN. However, there are studies informing that the rate of existence of simple phobia in cases with AN is 2–4 times more [59, 88]. Moreover, rate of existence of simple phobia by 2.37 times more had also been informed in cases with BN [88]. While lifetime simple phobia rate in cases with AN-R was 14.3% among outpatients, it had been informed as 34% among inpatients [13, 25]. And there is a study informing that this rate is 15% in cases with AN-BN [24]. In the studies performed until today, the rates relevant to the comorbidity of eating disorder and simple phobia are contradictory and not consistent. The rates of existence of simple phobia in cases with eating disorder, its effects on the primary disorder, and whether there is a difference with prevalence in the society should be searched by studies with extensive samples.

7. Agoraphobia

Different results had been obtained in the studies searching the agoraphobia in cases with eating disorder. For instance, Godart et al. [89] had informed that there are limited data in this field with varying rates in between 0–34.5% regarding the comorbidity of agoraphobia. The prevalence rate of agoraphobia in cases with AN had been found as 0% [25], it had been found as 3% in restricting subgroups [13], and as 20% in binge/purge AN [25]. In another study, attention had been drawn to lifetime high agoraphobia rates in women with AN as the result of comparison with control group (19.8% for AN-R and 27.3% for AN-BP) [14]. In a similar manner in other studies, rates of agoraphobia higher than the control group had been informed in cases with AN [27]. However, Rastam et al. [58] had informed that there was no difference in the studies. Different results from 0% [62] to 17.4% [25] had been informed for the lifetime prevalence of agoraphobia in cases with BN. In studies performed with nonclinical sample groups, the lifetime prevalence of agoraphobia had been informed in between 27–34.5% [29] for cases with BN [90]. In other studies performed as comparing with the control group, the rates of agoraphobia had been found to be high (7.5 and 17.4%) [14, 91]. In a study searching the relation of development of agoraphobia in cases with eating disorder and the family experiences, it had been informed that the mothers of the cases with agoraphobia have anxious and pessimist characteristic, and that it is affecting their relation with their children [92]. Still it is hard to completely explain the relation of eating disorders and agoraphobia.

8. Panic disorder

Different results had been informed regarding the prevalence of panic disorder in cases with eating disorder. For instance, the comorbidity of panic disorder in cases with eating disorder had been informed as 9–11% in a study, and it had been informed as 42–52% in another study [11, 93]. Panic disorder rates of 0–39% had been determined in cases with BN [62, 94]. Bushnell

et al. [29], in their study in which a control group was used, had determined the lifetime panic disorder prevalence higher in cases with BN. Kendler et al. [88] had reported that three times more panic disorder exists in cases with BN compared with the control group. But Garfinkel et al. [90] had obtained different results than the results of other studies, and they had specified that the rate of panic disorder is not higher than the control group. The lifetime prevalence of panic disorder had been informed as in between 4 and 7% in cases with AN-R and as 15% in cases with AN-BN [13, 24, 25]. And in two different studies in which the control groups were used, the prevalence of panic disorder had been specified as 2–8.1% in cases with AN [27, 58]. Walters and Kendler [59], in their studies performed with a nonclinical sample, had determined that individuals with 'possible anorexia' have the risk of panic disorder by 3.4 times more. For today, it is hard to completely explain the relation of eating disorders and panic disorder, and its prevalence.

9. Social phobia (social anxiety disorder)

Despite having many data regarding eating problems and obsessive-compulsive pathology, clinical manifestations involving fear such as social phobia, agoraphobia and panic disorder had attracted the academic attention less [95]. Despite this, some studies indicate that social phobia is more frequent in patients with eating disorder [11, 13, 17, 23, 24, 27, 62, 93, 96]. And in some studies, it had been alleged that the comorbidity of social phobia in cases with eating disorder is more extensive than OCD, and that the social phobia may be risk factor in the etiology of eating disorder [97]. In another study, levels of social phobia in patients with AN and BN had been compared with the control group, and higher rates had been determined among control group women. The authors had pointed out the relation in between social phobia and higher levels of eating psychopathology in bulimic patients [98]. There are differences among the studies on prevalence rate of social phobia and eating disorders. In AN, the prevalence rate of social phobia had been informed as in between 16 and 88.2%. [11, 98]. And in BN, the prevalence rate of social phobia had been informed as in between 17 and 67.8%. [72, 98]. In other two studies, higher rates of social phobia had been determined in cases with AN compared with the control group [27, 24]. But in the study performed by Rastam et al. [58], it had been concluded that it was not different from the control group. In a study searching for the relation in between development of social phobia and family experiences in cases with eating disorder, it had been specified that the fathers of the cases with social anxiety are emotionally inhibited (lack of sharing emotions with the child) and unable to relate with their children, and it had been alleged that it causes tendency of development of social phobia in the children [95, 98]. Still today it is hard to completely explain the relation of eating disorders and social phobia with the current data.

Comparison of the prevalence of individuals with eating disorder and comorbid-specific AD is given in **Table 1**.

Comorbid-specific AD	Reference (year)	Subjects (N)	Summary of results
OCD	1. Laessle et al. (1989)	AN-R (21),AN-BP(20), BN (27)	Prevalence of OCD 9.5%
	2. Lilenfeld et al. (1998)	AN-R (27), BN (47)	Prevalence of OCD 62%
	3. Fornari et al. (1992)	AN-R (24),AN-BP(18), BN (21)	Prevalence of OCD 66%
	4. Halmi et al. (1991)	AN (62)	Prevalence of OCD 11.3%
GAD	1. Lilenfeld et al. (1998)	AN-R (27), BN (47)	Prevalence of GAD 31%
	2. Godart et al. (2000)	AN-R (29), BN (34)	Prevalence of GAD 24%
	3. Powers et al. (1988)	BN(30)	Prevalence of GAD 10%
	4. Schwalberg et al. (1992)	BN(20)	Prevalence of GAD 55%
	5. Godart et al. (2003)	AN (166), BN (105)	Prevalence of GAD 45.6%
PTSD	1. Gleaves et al.(1998)	AN (121), BN (103)	Prevalence of PTSD 52%
	2. Brewerten et al.(1995)	BN (59)	Prevalence of PTSD 3%
	3. Schwalberg et al. (1992)	BN (20)	Prevalence of PTSD 10%
	4. Lilenfeld et al. (1998)	AN-R (27), BN (47)	Prevalence of PTSD 30%
	5. Dansky et al. (1997)	BN (72)	Prevalence of PTSD 21.4%
	6. Turnbull et al.(1997)	AN (90), BN (54)	Prevalence of PTSD 11%
	7. Vierling et al.(2015)	AN (57), BN (26), EDNOS(18)	Prevalence of PTSD 33.9%
Simple phobia (SP)	1. Laessle et al. (1989)	AN-R (21),AN-BP(20), BN (27)	Prevalence of Simple Phobia 14.3%
	2. Lilenfeld et al. (1998)	AN-R (27), BN (47)	Prevalence of Simple Phobia 19%
	3. Schwalberg et al. (1992)	BN(20)	Prevalence of Simple Phobia 10%
	4. Godart et al. (2000)	AN-R (29), BN (34)	Prevalence of Simple Phobia 21%
Agoraphobia	1. Godart et al.(2000)	AN-R (29), BN (34)	Prevalence of Agoraphobia 3%
	2. Laessle et al. (1989)	AN-R (21), AN-BP(20), BN (27)	Prevalence of Agoraphobia 20%
	3. Halmi et al.(1991)	AN (62)	Prevalence of Agoraphobia 14.5%
	4. Bushnell et al.(1994)	BN(20)	Prevalence of Agoraphobia 27%
	5. Garfinkel et al.(1995)	BN(58)	Prevalence of Agoraphobia 34.5%
Panic disorder	1. Bushnell et al. (1994)	BN(20)	Prevalence of Panic Disorder 20%
	2. Lilenfeld et al. (1998)	AN-R (27), BN (47)	Prevalence of Panic Disorder 4%
	3. Godart et al. (2000)	AN-R (29), BN (34)	Prevalence of Panic Disorder 7%
	4. Laessle et al. (1989)	AN-R (21), AN-BP(20), BN (27)	Prevalence of Panic Disorder 15%
	5. Halmi et al. (1991)	AN (62)	Prevalence of Panic Disorder 8.1%
	6. Garfinkel et al.(1995)	BN(58)	Prevalence of Panic Disorder 20%
	7. Kendler et al. (1991)	BN (128)	Prevalence of Panic Disorder 9%
	8. Rastam et al. (1995)	AN (51)	Prevalence of Panic Disorder 2%
Social phobia	1. Hinrichson et al.(2003)	AN-R(21), AN-BP(34), BN(59)	Prevalence of Social Phobia 88.2 %
	2. Godart et al. (2000)	AN-R (29), BN (34)	Prevalence of Social Phobia 55%
	3. Halmi et al. (1991)	AN (62)	Prevalence of Social Phobia 33.9%
	4. Iwasaki et al.(2000)	AN-R(62), AN-BP(36), BN(57)	Prevalence of Social Phobia 18%
	5. Kaye et al. (2004)	AN (97), BN(282)	Prevalence of Social Phobia 16%
	6. Lilenfeld et al. (1998)	AN-R (27), BN (47)	Prevalence of Social Phobia 31%
	7. Brewerten et al. (1995)	BN (59)	Prevalence of Social Phobia 17%

Table 1. Summary of research papers investigating prevalence of individuals with eating disorder and comorbid-specific AD.

10. Treatment of eating disorders with comorbid anxiety disorders

The information on how the treatment of cases having the comorbidity of eating disorders and anxiety disorders is required to be is limited. Whether the anxiety disorder or the eating disorder should be the primary subject of treatment, or whether they should be treated together is not clear. Some researchers had alleged that it is required to concentrate on the cause of eating disorder for an effective treatment. However, if the patient is still in advanced hunger, minimal effects may be expected from such a treatment. Moreover, one of the most significant issues in especially vomiting patients is the absorption of medication. CBT may be effective for depression in these patients. However, there is no evidence to suggest that CBT is a superior treatment compared with pharmacological treatments. On the other hand, it is clear that the comorbid conditions frequently cause the intensification of symptoms and negatively affect the response of treatment for the primary disorder. It had been specified in many studies that the psychiatric comorbidity causes intensification of symptoms of eating disorder, causes it to become chronic and causes the development of resistance against the treatment [18, 99]. Specialized treatment protocols are required in patients with psychiatric comorbidity with eating disorder [100]. Boutelle [101] had suggested exposure and response prevention component in case of comorbid obsessive-compulsive disorder. However, the results of the studies are inconsistent. Some studies had informed that comorbid anxiety may cause weak response to treatment [102–106]. But these results had not been supported in other studies [8, 35]. In one study, it had been specified that there was PTSD comorbidity on four female cases with eating disorder, and first, the trauma symptoms had been addressed in the treatment. The authors had informed that the symptoms of eating disorder had started to improve, while the PTSD symptoms were improving. Moreover, in the same study they had alleged that vomiting was being used not only to gain sense of self-control but also as a tool of purging for each of the cases [107].

In case of the comorbidity of eating disorders and anxiety disorders, it is clear that the treatment of both should be addressed together though the treatment approaches are not clearly being known. For this reason, CBT, psychotherapy, support groups, psychopharmacological treatment algorithms that are customized and whose effectiveness had been proven by studies with placebo control are required for the treatment of eating disorders and anxiety disorders.

11. Conclusion

The anxiety disorders existing in cases with eating disorder are OCD, SAD and GAD, respectively. Again in the studies, there are findings that the anxiety disorders start in the childhood period and before the diagnosis of eating disorder. In other words, anxiety disorder may be assessed as a risk factor for the development of eating disorder. Moreover, the comorbidity AD in individuals with eating disorder history may increase the tendency of being more anxious and shy. This condition may cause the symptoms of eating disorder to intensify and

disruption of compliance with treatment. Therefore, diagnosis and treatment of childhood-adolescence occurring AD may prevent the development of eating disorders. In the studies, it had been informed that all AD were at similar rates in individuals with a diagnosis of AN and BN. Only PTSD was approximately three times more frequent in individuals with BN and AN-BP as opposed to those with AN-R.

Despite all these, the subject relevant to comorbid anxiety disorders in individuals with eating disorder could not be completely clarified. For instance, EDNOS and binge eating disorder—which frequently exist in routine clinical implementations—have been omitted in studies made on this subject. In other words, the subject of anxiety disorders with comorbidity EDNOS and binge eating disorder has nearly never been included in the studies as different from other eating disorders. Another difficulty before the clinicians is how the cases having comorbid anxiety disorder with eating disorder will be treated, because the results of limited number of studies on this subject are not sufficient. In the future studies, the researchers should prefer reliable statistical strength, research design, standard measures and proper statistical methods. By this way, the comorbidity of eating disorders and anxiety disorders will be better understood by reaching to more consistent findings that are based on evidence. Perhaps in the future studies will be obtained results that similar or have common etiological causes of eating disorders and anxiety disorders.

Acknowledgements

I offer thanks to my family for suggesting that I write this book chapter.

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