

# How Low BMI and Obsession with Obesity Decrease Quality of Life in Bulimia Nervosa Women with Normal Weight

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SAORI MIYAMOTO, TSUNEO YAMAUCHI, TOMOKO HARADA, YUYA KODAMA,  
YOKO KITADA, KAZUYA NISHIMOTO, and KOKI INOUE

*Department of Neuropsychiatry, Osaka City University Graduate School of Medicine*

## Abstract

### **Background**

In recent years bulimia nervosa (BN) has been increasing, and attention is focused on improving quality of life (QOL) as a treatment target. There has been no study on the QOL of BN patients with normal weight. Therefore, in this study, we examined factors related to QOL decrease in BN women with normal weight.

### **Methods**

This study was a cross-sectional study of 70 BN women with normal weight. We used the World Health Organization Quality of Life Measure (WHOQOL-BREF) for QOL measurement and the Body Attitude Questionnaire (BAQ) for body image disturbances; we collected information such as age, body mass index (BMI), history of obesity, and medical history of consultation. A stepwise multiple regression analysis revealed how accurately the background factors and the BAQ would be related to the QOL of BN women with normal weight.

### **Results**

Lower BMI, strong “feeling fat”, weak “strength/fitness”, of the BAQ subscale, longer interval between their first medical examination at general hospitals/clinics and their first visit to the eating disorder (ED) specialized institution, that is our hospital, accounted for 47.0% of QOL. History of obesity did not significantly contribute to the results this time.

### **Conclusions**

This study found that low BMI was related to QOL of BN women even with normal weight. Based on the results, there was a possibility that psychoeducational approaches focused on not obsessing about weight or feeling fat may be important. The need to create a system that could connect patients to specialized treatment more easily was also highlighted.

Key Words: Quality of life; Bulimia nervosa; Body mass index; Eating disorders;  
Feeling fat

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Correspondence to: Saori Miyamoto, MD.

Department of Neuropsychiatry, Osaka City University Graduate School of Medicine,  
1-4-3, Asahimachi, Abeno-ku, Osaka 545-8585, Japan  
Tel: +81-6-6645-3821; Fax: +81-6-6636-0439  
E-mail: m2021372@med.osaka-cu.ac.jp

## Introduction

An eating disorder (ED) is a serious mental disorder that cause physical and mental symptoms, and might lead to impair social function and quality of life (QOL)<sup>1)</sup>. This mental disease is often observed in teenage girls and young adult women, and it has a high risk of causing various problems in the patients' social lives<sup>2)</sup>. ED is a mental disorder whose main symptoms are disordered eating, such as extreme dietary restrictions and/or overeating, and body image disturbances. According to *the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*, ED has been roughly divided into the following three types: anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorders (BED)<sup>3)</sup>. Nowadays, the number of young women with ED is increasing; in particular those with BN are dramatically increasing in number. BN patients are characterized by binge eating and inappropriate compensatory behaviors (e.g., the misuse of laxatives or vomiting) to prevent weight gain from binge eating. Patients with AN and those with BN are the same in that both have the drive for thinness and have a fear of gaining weight or becoming fat; however, they are different in that AN patients have a significantly low body weight. Many of BN patients actually maintain a normal weight<sup>4)</sup> unlike BED patients who have a high tendency toward unhealthy weight gain because they do not inappropriate compensatory behaviors for binge eating<sup>5)</sup>. Recently, there has been evidence that patients with ED have a significantly low QOL<sup>1,6-8)</sup>, so QOL improvement has been considered to be an effective way of curing the disease<sup>9-11)</sup>. Previous studies have told us that the decline of QOL in patients may be caused by abnormal eating behaviors like binge eating and purging<sup>8,12,13)</sup>, the fear of gaining weight or a desire for thinness, psychopathological symptoms of ED like body image disturbances<sup>14-16)</sup>, or a history of obesity<sup>4)</sup>. However, it is not clear if there is any difference in the degree of QOL according to the disease type and if there is any relationship between patients' symptoms and personal records, and their QOL values<sup>8,17,18)</sup>. Recently, in the internal medicine and surgical fields, low body weight studies of patients with AN<sup>19,20)</sup> and obesity research of BED patients<sup>12,21)</sup> have begun attracting attention. However, research in BN, which concerns almost normal weight, is lacking. We hypothesized that the high body mass index (BMI) was related to low QOL in normal weight BN patients considering their drive for thinness. The clarification of the effects of body image disturbances like feeling fat, history of obesity, and BMI on QOL in BN patients with normal weight may provide useful clinical benefits for the development of BN therapy.

It has been pointed out by many researchers that specialized medical treatments focusing on the improvement of QOL should be provided for ED patients because their QOL is significantly lower than normal<sup>9-11)</sup>. However, there are some problems with consulting with medical specialists in Japan. First, there are few medical institutions that treat ED in a professional manner<sup>22,23)</sup>. Specialized medical institutions that focus on ED can provide effective ED treatment because they have a great deal of experience and the necessary medical skills as opposed to general institutions that might not provide ED patients with the most appropriate treatment. Second, there is a problem on the patients' side, which is the "access problem". In other words, ED patients, and especially BN patients, usually take a lot before they consult with a doctor specializing in ED treatment<sup>24-26)</sup>. Furthermore, Mond et al report that women with bulimic-type EDs have already deteriorated psychopathological symptoms a low level of QOL before they consult with a doctor<sup>27)</sup>. So, we assumed that the interval between their first consultation with a local general doctor and their visit to a doctor specializing in ED treatment would be an important predictor regarding the decline in QOL.

In this study, we investigated the possibility of the influence of some research items on the QOL of

BN women with normal weight, a group that has not been closely examined so far. The research items are as follows: body image disturbances like feeling fat, BMI, interval between their first visit to a general hospital/clinic and their visit to an ED specialist, and history of obesity.

## **Methods**

### ***Diagnosis and definition of ED and obesity***

ED was diagnosed by specialized psychiatrists with extensive clinical experience in eating disorders based on the diagnostic criteria in the DSM-5 of the American Psychiatric Association<sup>3)</sup>. We have defined a BMI of less than 17.5 kg/m<sup>2</sup> as a significantly low body weight (Criterion A of anorexia nervosa) on the 2012 National Health and Nutrition Survey in Japan ([www.mhlw.go.jp/bunya/kenkou/eiyou/dl/h24](http://www.mhlw.go.jp/bunya/kenkou/eiyou/dl/h24)). We have carried out this study on BN women with normal weight (BMI of 17.5 kg/m<sup>2</sup> or more and less than 25.0 kg/m<sup>2</sup>) according to the Japan Society for the Study of Obesity (<http://www.jasso.or.jp>). We have considered patients with a BMI of 25.0 kg/m<sup>2</sup> or more as having a history of obesity.

### ***Patients***

This was a cross-sectional study based on the medical records of BN patients with eating disorders who visited the Neuropsychiatry Outpatient Clinic of Osaka City University Hospital (Osaka, Japan) between January 2014 and December 2016. This facility is a large-scale urban-type general hospital with 972 beds and is one of the few medical institutions that provide both inpatients and outpatients with high quality specialized ED treatment. Few patients visit our hospital for their first medical examination. Instead, the great majority of patients visit us after they have consulted doctors at local hospitals, which do not specialize in eating disorder treatment, for internal, gynaecological, or mental diseases. There were 324 patients diagnosed with ED at the first medical examination during the research period, and 280 of these patients (86.4%) completed the questionnaire. There were 159 AN patients (56.8%), 84 BN patients (30.0%), 8 BED patients (2.9%), and 29 other EDs patients (10.4%). Among the BN patients, there were 70 women (89.3%) who registered at a normal weight at the time of initial visit.

### ***Procedure***

We had our patients take psychological tests such as the World Health Organization Quality of Life Measure (WHOQOL-BREF) and the Body Attitude Questionnaire (BAQ)<sup>28)</sup> at the time of their first visit to us. From their medical records, we gathered their personal data concerning age, BMI, weight fluctuation, and history of consultation. We tried to clarify the relationship between each of these factors and the patient's QOL.

The interval between their first medical examination at the general hospitals/clinics and their first visit to our ED special treatment hospital was defined as the general treatment period.

### ***Measures***

#### **1. WHOQOL-BREF**

QOL was assessed using the WHOQOL-BREF. The WHOQOL-BREF is a questionnaire developed by the World Health Organization to evaluate the QOL of people as a whole; it was proven to be reliable and valid. It consists of 26 questions in the following four areas: physical health, psychological health, social relations, and environmental health. Each of the items is evaluated based on a 5-point Likert Scale (1-5). We divide the total score of all items by 26 (the number of items) to obtain the "mean QOL" showing the QOL of the whole life. A higher score represents a

better QOL.

## 2. BAQ

We assessed body image based on the criteria of the Japanese version of the BAQ, which was proven to be reliable and valid<sup>29)</sup>. The BAQ, which Ben-Tovim et al created in 1991<sup>28)</sup>, is a questionnaire that includes 44 questions that assess a broad range of attitudes women hold towards their bodies. Each of the items is evaluated based on 5-point Likert Scale (1-5). This questionnaire has subscales that encompass six distinct aspects of body experience: “feeling fat”, feelings of “body disparagement”, self assessed physical image of “strength/fitness”, “salience” of weight and shape to the individual, self-perceived physical “attractiveness”, and consciousness of “lower body fatness”.

### **Statistical analysis**

Sample profiles were presented using descriptive statistics, mean, and standard deviation (SD). Welch’s test was conducted to compare the average scores of the WHOQOL-BREF and the BAQ between our research and the general population studies of Nakane<sup>30)</sup> and Mera<sup>31)</sup> et al. Pearson’s  $r$  correlations were calculated between each of the measures to assess for associations between these variables. Since the history of obesity is a nominal variable, we calculated the correlation ratio ( $\eta$ ). Stepwise multiple regression analysis was performed to find out how accurately the background factors and the BAQ would be related to the QOL of ED patients. We regarded two-tailed  $p$  values less than 0.05 as significant. We analyzed the data using SPSS 24.0 for Mac OS X (SPSS Japan, Tokyo, Japan).

### **Ethics statement**

Due to the retrospective nature of this study, personal data were protected and individuals were not identified; thus, informed consent was not obtained. The study protocol has been reviewed and approved by the Ethical Committee of Osaka City University Graduate School (approval number: 2891).

## **Results**

### **Participant demographics**

Table 1 shows three of our research results: clinical features of 70 BN women with normal weight, the score range of each item of the WHOQOL-BREF and the BAQ, and the mean value and SD. The BN women with normal weight (70 people) accounted for 93.0% of all the BN women (75 people) who visited us for their first consultation. The average age at the time of their first visit to us was  $27.4 \pm 8.6$  years old and the average interval between the general treatment periods was  $3.7 \pm 5.6$  years. Among the subjects of this study, unmarried women accounted for 80.0% of the sample and students or workers accounted for 68.6% of the sample. Subjects who had a history of obesity accounted for 23.2% of the sample.

In the table 2, There were significant differences ( $p < 0.01$ ) between the average values of each psychological examination during this time and the average values of healthy subjects of the previous study.

Table 3 shows the departments the patients visited on their first visit and the percentage of patients that visited each department. The majority of subjects visited the psychiatry and psychosomatic medicine departments, which accounted for 64.3% of the sample: additionally, of these, psychiatric and psychosomatic medicine clinics had the largest share of visitors, accounting for 52.9% of the sample. This was followed by patients visiting the department of internal medicine at 17.1%,

**Table 1. Clinical characteristics**

	mean	SD
Age of onset of EDs	19.4	6.7
Age at first visit to medical institution	23.5	7.1
Age at first visit to our unit	27.4	8.6
The general treatment period <sup>a</sup> (years)	3.7	5.6
BMI at first visit to our unit (kg/m <sup>2</sup> )	20.2	2.0
Max BMI (kg/m <sup>2</sup> )	24.1	3.3
Min BMI (kg/m <sup>2</sup> )	17.2	2.0
%		
History of obesity <sup>b</sup>	23.2	

<sup>a</sup>The interval between their first medical examination at general hospitals and their first visit to our ED special treatment hospital. <sup>b</sup>Obesity refers to a BMI of 25kg/m<sup>2</sup> or more. ED, eating disorder; QOL, Quality of Life; and BMI, bodymass index.

**Table 2.** Comparison of the average values of each psychological examination between the healthy subjects and the BN patients

	score range	BN patients of this study		general population of previous studies		p
		mean	SD	mean	SD	
WHOQOL-BREF subscale:						
Physical health	1-5	2.8	0.7	3.5 <sup>a</sup>	0.6 <sup>a</sup>	<0.01
Psychological	1-5	2.2	0.8	3.3 <sup>a</sup>	0.6 <sup>a</sup>	<0.01
Social relationships	1-5	3.0	0.7	3.4 <sup>a</sup>	0.7 <sup>a</sup>	<0.01
Environment	1-5	2.9	0.7	3.2 <sup>a</sup>	0.6 <sup>a</sup>	<0.01
Mean QOL	1-5	2.7	0.6	3.3 <sup>a</sup>	0.5 <sup>a</sup>	<0.01
BAQ subscale:						
Feeling fat	0-70	54.1	8.1	41.6 <sup>b</sup>	10.3 <sup>b</sup>	<0.01
Body disparagement	0-40	26.1	6.1	15.7 <sup>b</sup>	3.5 <sup>b</sup>	<0.01
Strength/fitness	0-30	14.7	4.2	18.5 <sup>b</sup>	4.3 <sup>b</sup>	<0.01
Salience	0-40	30.1	6.0	19.9 <sup>b</sup>	4.7 <sup>b</sup>	<0.01
Attractiveness	0-25	10.6	3.5	12.6 <sup>b</sup>	2.9 <sup>b</sup>	<0.01
Lower body fatness	0-20	11.1	2.7	13.5 <sup>b</sup>	3.2 <sup>b</sup>	<0.01

<sup>a</sup>Citation from previous research (Nakane et al 1999). <sup>b</sup>Citation from previous research (Mera et al 2011). BN, bulimia nervosa; WHOQOL-BREF, World Health Organization Brief Quality of Life Assessment Scale; and BAQ, Body Attitude Questionnaire.

the gynaecological department at 4.3%, and the pediatrics department at 1.4%. Only two subjects visited us for their first medical examination, which accounted for 2.9% of the sample.

### Correlation analysis

Correlations among the study variables are displayed in Table 4. The correlation coefficient ( $r$ ) and correlation ratio ( $\eta$ ) are shown. We found a significant weak to moderate negative correlation between the BAQ's feeling fat ( $r=-0.42$ ), body disparagement ( $r=-0.45$ ), and salience ( $r=-0.34$ ) and the mean QOL; strength/fitness ( $r=0.51$ ) and the mean QOL showed a significant moderately positive correlation. There was no correlation between other factors of the BAQ and background



**Table 3. The departments of the patients visited on their first visit and the percentage of patients that visited each department**

	n	%
Psychiatry and Psychosomatic medicine	45	64.3
Hospital	(8)	(11.4)
Clinic	(37)	(52.9)
Internal medicine	12	17.1
Pediatrics	1	1.4
Gynecology	3	4.3
Others	3	4.3
Unknown	4	5.7
None	2	2.9

**Table 4. Correlation coefficient and correlation ratio of the study variables**

	r								$\eta$
Measures	2	3	4	5	6	7	8	9	10
1. Mean QOL	-0.42**	-0.45**	0.51**	-0.34**	0.14	-0.25	0.21	-0.20	0.13
2. Feeling fat		0.71**	-0.10	0.79**	-0.10	0.69**	0.36**	-0.11	0.06
3. Body disparagement			-0.19	0.70**	-0.40**	0.46**	0.21	-0.01	0.03
4. Strength/fitness				-0.07	0.02	-0.02	0.17	-0.15	0.07
5. Salience					-0.12	0.65**	0.23	-0.01	0.02
6. Attractiveness						-0.03	-0.03	0.03	0.28*
7. Lower body fatness							0.25*	-0.02	0.09
8. BMI at first visit to our unit								-0.01	0.17
9. The general treatment period <sup>a</sup>									0.30*
10. History of obesity <sup>b</sup>									

n=70, \*p<0.05, \*\*p<0.01. <sup>a</sup>The interval between their first medical examination at general hospitals and their first visit to our ED special treatment hospital. (years) <sup>b</sup>Obesity refers to a BMI of 25 kg/m<sup>2</sup> or more. QOL, Quality of Life; and BMI, body mass index (kg/m<sup>2</sup>).

factors and average QOL. The history of obesity showed a weak but significant positive correlation with attractiveness ( $\eta=0.28$ ) and the general treatment period ( $\eta=0.30$ ).

### **Stepwise multiple regression analysis**

Table 5 shows the stepwise multiple regression analysis with the average score of the mean QOL as the outcome variable and the BAQ, BMI at first visit to our unit, general treatment period, and history of obesity as independent variables of BN women with normal weight. Following a four-step iteration, strength/fitness ( $\beta=0.31$ ,  $p<0.01$ ), feeling fat ( $\beta=-0.57$ ,  $p<0.01$ ), BMI at first visit to our unit ( $\beta=0.29$ ,  $p=0.020$ ), and general treatment period ( $\beta=-0.22$ ,  $p=0.046$ ) were found to be related to the mean QOL significantly. The final model accounted for 47.0% ( $F=12.24$ ,  $p<0.01$ ) of the variance.

## **Discussion**

The purpose of this study was to examine the influence of BMI, body image disturbance, general treatment period and history of obesity on the mean QOL in BN women with normal weight. The results showed that lower BMI, strong “feeling fat”, weak “strength/fitness” of the BAQ subscale, and



**Table 5. Stepwise multiple regression analysis of determinants of the mean QOL of BN women with normal weight**

	$\beta$	$R^2$	Adjusted $R^2$	F
<i>Step1</i>				
Strength/fitness	0.51 **			
		0.26	0.24	16.87 **
<i>Step2</i>				
Strength/fitness	0.44 **			
Feeling fat	-0.40 **			
		0.41	0.39	19.82 **
<i>Step3</i>				
Strength/fitness	0.36 **			
Feeling fat	-0.54 **			
BMI <sup>a</sup>	0.28 *			
		0.47	0.44	13.96 **
<i>Step4</i>				
Strength/fitness	0.31 **			
Feeling fat	-0.57 **			
BMI <sup>a</sup>	0.29 *			
General treatment period <sup>b</sup>	-0.22 *			
		0.52	0.47	12.24 **

BAQ, BMI, General treatment period and History of obesity were selected as independent variables.  $n=70$ , \*  $p<0.05$ , \*\*  $p<0.01$ . <sup>a</sup> BMI at first visit to our unit ( $\text{kg/m}^2$ ). <sup>b</sup> The interval between their first medical examination at general hospitals and their first visit to our ED special treatment hospital. (years) QOL, Quality of Life; BAQ, Body Attitude Questionnaire; BMI, body mass index; BN, bulimia nervosa; and ED, eating disorder.

the general treatment period accounted for 47% of the mean QOL. We found that patients' history of obesity had little to do with the research findings.

In this study, we found that lower BMI at first visit was related to lower mean QOL, even in the normal body weight range. We initially hypothesized that BN females felt fatter than they actually are even in the normal body weight range, and QOL was lower in subjects with higher BMI because of the negative influences of psychopathology that are peculiar to EDs (e.g., drive for thinness, fear of gaining weight, body image disturbances) on the QOL. As for patients with BED and community sample, some researchers reported that BMI values that were less than 20 or more than 30, both of which were away from the normal body weight, were associated with the lower QOL<sup>12,32)</sup>. In previous BN studies, only the result that BMI and QOL have no relationship was obtained, but there was also the possibility of confusion since the study contained an obese person<sup>33)</sup>. Interestingly, contrary to our initial expectation that the higher the BMI, the lower the mean QOL, this study showed that the lower the BMI, the lower the mean QOL. It was reported that people with excessively low body weight tend to overestimate their body size to a greater capacity than people with normal body weight<sup>34)</sup>. We think it likely that the loss of their body weight would not make BN women happy, but it would make them suffer from even worse body image disturbances, never-ending anxiety and fear, and obsession, which would cause the lower QOL. In addition, it has been reported that, compared with healthy people, ED patients have a higher risk of suffering from medical complications such as

organ disorders, electrolyte abnormality, pregnancy-related risks, easy bleeding, and arrhythmia<sup>35)</sup>. Most notably, health hazards caused by low body weight and abnormal purging behavior have become a serious problem that needs to be solved<sup>35,36)</sup>. It is hypothesized that BN patients, though they have a normal body weight, suffer from excessive physical burden because of their repeated abnormal eating behaviors (e.g., binge eating and purging). Even if the loss or gain of body weight is within normal limits, it is expected that BN patients suffer from much severer physical burdens than healthy people with normal weight. Reasonably, this can lead to the deterioration of the QOL. No studies on the relationship between QOL and body image focusing on BN patients with normal weight have been conducted so far. As far as we know, our study is the first research to show the relationship between BMI and QOL for BN patients with normal weight.

In this study, with the BAQ evaluating the body image of BN women, we demonstrated that “feeling fat” and “strength/fitness” were associated with QOL. Furthermore, both the increase of “feeling fat” and the weak image of “strength/fitness” could be related to the deterioration of QOL. Our study also hypothesized that BN patients would feel a sense of being fat more strongly than healthy people, which was supported by the results to the questions concerning obesity in the BAQ with BN patients having significantly higher points than healthy people who were examined in previous studies<sup>31)</sup>. There have been several studies that point out the relation between feeling overweight and QOL, and this relationship seems to be a strong factor if it related to a lower QOL than abnormal eating behaviors<sup>6,14)</sup>. Our study, which exclusively dealt with BN women with normal weight, agreed with these previous researches on this point. However, the scores in the field of strength/fitness of the BAQ were, as we had expected, closely related to the QOL. The low scores of strength/fitness mean that there is a low QOL. This is because WHOQOL-BREF is a self-reported type of questionnaire, so what BN patients think about themselves is likely to be reflected plainly in the scores.

Even healthy young Japanese women hope to keep themselves as slim as possible. This is partly because there is a general atmosphere in society, which continues to give people a distorted perspective that being fat is an evil and worthy of ridicule<sup>37)</sup>. What is worse is that the mass media seems to support the trend<sup>38)</sup>. So, young women are apt to be overly sensitive to minor changes in their body weight<sup>38,39)</sup>. It is also reported that most of the general population, though in good shape, complain about body image<sup>16)</sup>. This fact could easily lead ED patients to think about themselves even more seriously in this aspect, because they have a morbid drive for thinness, a fear of gaining weight, and body image disturbances, which most healthy people do not think about.

The history of obesity has also been noted as a factor closely related to body images<sup>40,41)</sup>, and the relationship between the history of obesity and QOL was also investigated. However, in this study, the history of obesity was not related to QOL significantly.

Even when BN patients are at clinical sites, they often try to lose weight, demanding dietary control though they are normal weight. Some previous studies stated that at clinical sites therapeutic methods such as cognitive psychotherapy, which does not touch on patients’ body weight, worked better for the improvement of QOL in their later lives compared with treatments that attach value to weight and diet control<sup>42,43)</sup>. The research results of our study told us that we should make it a goal to advise ED patients to think otherwise and encourage them to change their sense of value concerning their body image. It is important for them to try not to be overly worried about their body weight, to not seek a low body weight but just keep their weight within a normal limit, and to get rid of the

wrong image regarding their body. All of these psychoeducational approaches should work well in making them feel happier in their daily lives. It was shown that a long general treatment period might be related to a low QOL. This supported our hypothesis that delays in ED specialized treatment lead to a decrease in QOL for BN patients. ED specialized medical institutions are limited, and 72.0% of ED patients reported that they will visit general practitioners at the beginning of treatment<sup>25)</sup>. Almost all cases of ED patients who visited our hospital, a specialized medical institution, visited local general medical institutions first. There is also a report that a majority of ED patients take 1.1 years between their first visit to a medical institution and actually going to a specialist<sup>25)</sup>. According to the results of this study, the average treatment period is 3.9 years, which means treatment clearly took a long time. Also in Japan, as in previous studies, the current state of delays in ED specialized therapy has been found to be serious; the establishment of introduction routes is desired in the future.

There is a past report that ED patients realized they were suffering from an ED on average 3.6 years after the onset of the ED, and they sought treatment on average 4.2 years after the onset of the ED<sup>25)</sup>. In addition, past reports have noted that despite providing information on treatment and education, women with ED accompanied with regional overeating only visited medical institutions 22.0% to 44.0% of the time; even if they visited, the main purpose was to lose weight<sup>26)</sup>. In women with ED accompanied by overeating in the community, there are reports that patients that had been treated had already advanced with ED pathology, distress and dysfunction<sup>27)</sup>. In order to prevent the chronicity of the disease, the accompanying progress of psychopathology associated with ED, and the deterioration of QOL, knowledge must be given to general practitioners and non-specialist hospitals so that patients can be referred to special treatment as soon as possible. It is important to spread dissemination and medical cooperation. It is also important to recognize the adverse effects of ED at an early stage and to educate the public on the importance of receiving treatment so that individuals with ED who are not connected to treatment can potentially receive help.

### ***Limitation***

Our study has several limitations. First, our hospital is an ED specialized treatment facility, so among the referral patients from other hospitals, there may be many patients with high severity problems, those with coexisting mental illness, those with environmental problems, and those with excessive binge eating behaviors. Therefore, it is unknown if the overall image of BN can be accurately reflected in the research sample of BN women with normal weight. Second, QOL is a complicated concept, so while a cross-sectional self-evaluation (i.e., WHOQOL-BREF) was used this time, to further the research, it would be wise to include a longitudinal, qualitative approach and objective evaluation are necessary in the future. Third, regarding the history of obesity, since hearing it retrospectively, there is a possibility that the height at that time could not be extracted with sufficient accuracy. Last, we examined the presence or absence of overeating, vomiting, and laxative abuse this time, but quantitatively evaluating these was inadequate. It is hoped that the future establishment of a quantitative measurement method will enable accurate studies on the relationship between these variables and QOL in the future.

### ***Conclusion***

This study provided further evidence that BMI, “feeling fat”, image of “strength/fitness”, and the general treatment period are associated with the mean QOL. In order to improve the QOL of BN women with normal weight, psychoeducational approaches to body image disorders that do not obsess

with weight but provide support for daily living difficulties and psychological conflicts are more important. The findings also suggest the need to make a system that could connect patients to specialized treatment as soon as possible. Further studies will be necessary in the future considering the use of a disease-specific QOL scale, increasing the number of subjects, introducing a control group, and so forth.

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