Research Article | Internal Medicine

The Relationship Between Eating Behaviors and Functional Status in Female Patients Diagnosed with Fibromyalgia

Alper Mengi1*

Abstract

Aim. To evaluate whether eating behaviors of female patients with fibromyalgia syndrome differ from those of the healthy population, what factors affect these behaviors, and whether eating behaviors are effective on patients’ life quality and functional status.

Materials and Methods. This cross-sectional and observational study included 55 female fibromyalgia patients and 55 healthy female volunteers. All participants were assessed using demographic data, body mass index (BMI), and the Three-Factor Eating Questionnaire (TFEQ) (Uncontrolled Eating, Cognitive Restraint, Emotional Eating, and Hunger Susceptibility). Fibromyalgia patients were assessed using the Visual Analogue Scale (VAS) and Fibromyalgia Impact Questionnaire (FIQ).

Results. BMI, Uncontrolled Eating, and Hunger Susceptibility scores differed significantly between fibromyalgia patients and healthy volunteers (p < 0.05). In fibromyalgia patients, the TFEQ subscores were not correlated with the FIQ (p > 0.05). There was a positive correlation between the Cognitive Restraint score and age, rest and night pain scores in fibromyalgia patients (p < 0.05). Increasing age was an independent predictor of Cognitive Restraint in fibromyalgia patients (p=0.003).

Conclusions. The proportion of overweight/obese patients, BMI, Uncontrolled Eating, and Hunger Susceptibility were significantly higher among fibromyalgia patients. Fibromyalgia patients’ eating behaviors were not associated with their quality of life and functional status. Increasing age appeared to be a predictor of Cognitive Restraint degree.

Keywords
Fibromyalgia Syndrome; Body Mass Index; Eating Behaviors; Obesity; Quality Of Life

1Department of Pain Management, Cerrahpasa Faculty of Medicine, Istanbul University-Cerrahpasa, Istanbul, Turkey
*E-mail: a_mengi22@hotmail.com

Introduction

Fibromyalgia syndrome (FMS) is the third most common musculoskeletal condition, affecting 2-3% of the population worldwide [1]. Although the pathogenesis of FMS is not yet well known, an abnormal regulation of the pain modulation system, psychosocial problems, disturbances in the neuroendocrine and autonomic nervous systems, genetic factors, and environmental stress have been proposed to be involved [2]. The optimal treatment of FMS has been reported to be a combination of non-pharmacological and pharmacological modalities [3].

In addition to widespread musculoskeletal pain, which is the main symptom of FMS, tenderness in specific regions, fatigue, poor sleep, cognitive problems, and many other symptoms are frequently seen in FMS patients [4]. Although a strong association between FMS and overweight and/or obesity has been reported [5–7], there are limited studies evaluating eating disorders or habits in FMS. Elk-fury et al. [8] reported that emotional eating was higher in patients with FMS. A study evaluating patients with existing or previous history of binge eating disorder (BED) reported that BED coexisted with FMS [9]. According to another study, BED might facilitate the relationship between depression and obesity in obese FMS patients [10]. However, in an adolescent study, no difference between FMS adolescents and healthy controls in terms of eating disorders was observed [11]. Various studies have reported that patients with FMS consume certain food groups less than healthy subjects [12, 13].

In our daily clinical practice, when dealing with FMS, we have encountered complaints such as the inability to restrict eating, eating too often, or not feeling satiated. Although the literature has been reported that some eating disorders may be accompanied by FMS or that FMS patients may consume less of certain foods [8–13], the data...
The Relationship Between Eating Behaviors and Functional Status in Female Patients Diagnosed with Fibromyalgia

on eating behaviors of adult patients with FMS are not clear. Therefore, we aimed to determine whether eating behaviors of female patients diagnosed with FMS differ from those of the healthy population, what factors affect these behaviors, and whether eating behaviors are effective on quality of life (QoL) and functional status of these patients.

Materials and Methods

Study Design
This cross-sectional and observational study was conducted in Çanakkale Mehmet Akif Ersoy State Hospital (Çanakkale, Turkey) Physical Medicine and Rehabilitation Outpatient Clinic between January 29, 2020 and July 7, 2020. Patients diagnosed with FMS and their healthy relatives were recruited in the study.

Participants
A detailed clinical history (including current or past medications, reasons for applying to outpatient clinics in the past, current or past diagnoses) was noted for each participant, and all participants underwent physical examination by the same physician. Participants were evaluated for inclusion or exclusion criteria based on detailed clinical history and physical examination.

Control Group
Fifty-five healthy female volunteers were included in the control group. Inclusion criteria were being a premenopausal woman at the age of 18-40 years and not having a known disease (acute or chronic) or using medications.

Patients
Fifty-five female patients with FMS were included in the patient group. Inclusion criteria were being a premenopausal woman at the age of 18-40 years, a diagnosis of fibromyalgia for the first time, a diagnosis of FMS according to the American College of Rheumatology 2013 diagnostic criteria [14]. Exclusion criteria involved uncooperative patients, patients being pregnant or breastfeeding, those with eating disorders such as bulimia nervosa, anorexia nervosa, hyperthyroidism or hypothyroidism, peripheral or central nervous system disorders, chronic inflammatory disease, malignancy, an history of infectious and mental disorders (the Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) were administered to all patients with no history of mental diseases; those with BDI score ≥ 17 [15] or BAI score ≥ 8 [16] were excluded from the study), cardiac pathologic such as coronary artery disease or heart failure, chronic liver failure, diabetes mellitus, chronic kidney failure.

Evaluation Criteria
Demographic data (age, education level, occupation, marital status, income level) of all participants were evaluated and body mass indices (BMI) were calculated. For BMI, the World Health Organization classification was used [17]. Pain intensity of all patients diagnosed with FMS was assessed using a 10-cm visual analogue scale (VAS), with “0” representing no pain and “10” representing unbearable pain. Average pain intensities in motion, at rest, and at night over the past week were assessed with the VAS [18]. The duration of complaints in FMS patients was questioned as months. QoL and functional status of FMS patients were assessed using the Fibromyalgia Impact Questionnaire (FIQ), validated in a Turkish study. This scale measures 10 different characteristics, with higher scores representing decreased functionality [19, 20].

The Three-Factor Eating Questionnaire (TFEQ), that was validated in a Turkish study, was used to evaluate eating behaviors of all study participants [21, 22]. The questionnaire contains 18 questions, each of which is evaluated on a 4-point Likert-type scale. Participants are assessed by three factors: the degree of uncontrolled eating (Uncontrolled Eating), the degree to which they consciously control their eating behavior (Cognitive Restraint), and the degree of eating when they are emotional (Emotional Eating). According to Kirac et al. [21], in addition to these three factors, the questionnaire assesses Hunger Susceptibility as well. Higher subscale scores indicate an increase in eating behavior.

Statistical Analysis
SPSS version 19.0 software (IBM Corporation, Armonk NY, USA) was used for statistical analysis. The data distribution was determined by the Shapiro-Wilk test. Continuous variables were expressed as means ± standard deviation and minimum-maximum, while categorical variables were expressed as number and percentage. Groups were compared using the Mann-Whitney U test and the Independent-Samples t-test for non-parametric and parametric variables, respectively. The difference between categorical variables of the groups were assessed using the Yates’ Chi-Square. Correlations were assessed using Pearson correlation analyses. A multivariate analysis with a linear regression model was used to identify the factors of Uncontrolled Eating, Cognitive Restraint, Emotional Eating, and Hunger Susceptibility. Confidence intervals were defined at 95%, and statistical significance was determined at a level of p < 0.05.

When type 1 error was set at 5% (bidirectional), type 2 error at 5% (95% power), and effect size at 73% for TFEQ between groups (according to the literature, calculated using the TFEQ Hunger Susceptibility subscale [21]), it was determined that at least 50 cases should be included in each group using the G*Power version 3.1.9.2 software (Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany). Considering the possible loss of participants, 55 individuals (110 participants in total) were planned for each study group.

Results
Participants’ demographic and clinical characteristics are provided in Table 1. Although there was no difference between the two groups in terms of age, education level, occupation, marital status, and income level, there was a significant difference in terms of BMI (p < 0.05). Among patients with FMS, there were significantly more overweight.
The Relationship Between Eating Behaviors and Functional Status in Female Patients Diagnosed with Fibromyalgia — 3/8

Table 1. Demographic and clinical characteristics of study groups.

<table>
<thead>
<tr>
<th></th>
<th>Fibromyalgia Patients (n=55)</th>
<th>Healthy Volunteers (n=55)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>37.1±3.5 (28.0-40.0)</td>
<td>36.1±3.1 (28.0-40.0)</td>
<td>0.110</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.2±3.8 (17.3-34.2)</td>
<td>23.7±3.3 (19.5-31.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>n %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²) ≤24.9</td>
<td>15 27.3</td>
<td>46 83.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI (kg/m²) ≥25</td>
<td>40 72.7</td>
<td>9 16.4</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>31 56.4</td>
<td>32 58.2</td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td>14.5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>9 16.4</td>
<td>13 23.6</td>
<td>0.622</td>
</tr>
<tr>
<td>University</td>
<td>7 12.7</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>44 80.0</td>
<td>40 72.7</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office worker</td>
<td>9 16.4</td>
<td>11 20.0</td>
<td>0.369</td>
</tr>
<tr>
<td>Heavy duty worker</td>
<td>2 3.6</td>
<td>4 7.3</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>42 76.4</td>
<td>35 63.7</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>2 3.6</td>
<td>7 12.7</td>
<td></td>
</tr>
<tr>
<td>Income more than expenses</td>
<td>11 20.0</td>
<td>11 20.0</td>
<td></td>
</tr>
<tr>
<td>Income less than expenses</td>
<td>26 47.3</td>
<td>24 43.6</td>
<td>0.912</td>
</tr>
<tr>
<td>Income equal to expenses</td>
<td>18 32.7</td>
<td>20 36.4</td>
<td></td>
</tr>
</tbody>
</table>

Notes: data are presented as mean ± SD (min-max) and number (percent) where applicable; a – Independent-Samples t-test, b – Yates’ Chi-Square test.

The scores of Uncontrolled Eating and Hunger Susceptibility were significantly higher in patients with FMS (p<0.001). The results are presented in Table 2.

In patients with FMS, the Uncontrolled Eating score was negatively correlated with the Cognitive Restraint score, while it was positively correlated with the Hunger Susceptibility and Emotional Eating scores. There was a negative correlation between the Cognitive Restraint score and the Hunger Susceptibility score, while there was a positive correlation between the Emotional Eating score and the Hunger Susceptibility score (Fig. 1) (p < 0.05). There was a positive correlation between the Cognitive Restraint score and age, rest and night pain scores (Fig. 1 and 2) (p < 0.05). There was no correlation between the TFEQ scores, FIQ scores, and complaint duration (Fig. 3) (p > 0.05).

The TFEQ scores (Uncontrolled Eating, Cognitive Restraint, Emotional Eating, Hunger Susceptibility) and other parameters (FIQ, duration of complaints, age, BMI, VAS motion, VAS rest, VAS night) were assessed using multivariate analysis with a linear regression model. Although increasing age was an independent predictor of the Cognitive Restraint score (β=0.512, p=0.003, Adjust R²=0.205), there was no association between the Cognitive Restraint score and the FIQ, duration of complaints, BMI, VAS motion, VAS rest, VAS night (p > 0.05). No association was found between Uncontrolled Eating (p=0.501), Emotional Eating (p=0.844), Hunger Susceptibility (p=0.628), and other predictors in a linear regression model.

**Discussion**

This study was conducted to determine whether eating behaviors of female patients with FMS differ from those of the healthy population, what factors affect these behav-

Table 2. Demographic and clinical characteristics of study groups.

<table>
<thead>
<tr>
<th></th>
<th>Fibromyalgia patients (n=55)</th>
<th>Healthy volunteers (n=55)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>VAS motion 8.2±1.8</td>
<td>9.3±2.4</td>
<td>0.009a</td>
</tr>
<tr>
<td></td>
<td>VAS rest 5.2±1.8</td>
<td>15.7±3.4</td>
<td>0.255a</td>
</tr>
<tr>
<td></td>
<td>VAS night 5.5±2.3</td>
<td>6.0±1.9</td>
<td>0.262b</td>
</tr>
<tr>
<td>Duration of complaints (months)</td>
<td>17.3±13.7</td>
<td>7.0±2.1</td>
<td>0.012a</td>
</tr>
<tr>
<td>FIQ</td>
<td>TFEQ Uncontrolled Eating 10.8±3.6</td>
<td>9.3±2.4</td>
<td>0.009a</td>
</tr>
<tr>
<td></td>
<td>Cognitive Restraint 14.9±3.9</td>
<td>15.7±3.4</td>
<td>0.255a</td>
</tr>
<tr>
<td></td>
<td>Emotional Eating 6.7±3.0</td>
<td>6.0±1.9</td>
<td>0.262b</td>
</tr>
<tr>
<td></td>
<td>Hunger Susceptibility 8.4±3.7</td>
<td>7.0±2.1</td>
<td>0.012a</td>
</tr>
</tbody>
</table>

Notes: data are presented as mean ± SD where applicable. a – Independent-Samples t-test, b – Mann-Whitney U test.
The Relationship Between Eating Behaviors and Functional Status in Female Patients Diagnosed with Fibromyalgia

Figure 1. Correlations between the TFEQ scores, age, and BMI.


Figure 2. Correlations between the TFEQ and VAS scores.


The present study established that the number of overweight/obese patients, BMI, uncontrolled eating, and hunger susceptibility were significantly higher among patients with FMS, regardless of history of mental diseases, as compared to healthy female volunteers of the same age. At the same time, eating behaviors of patients were not associated with their QoL and functional status. The degree of consciously restricting eating correlated with increased age and pain severity.
The Relationship Between Eating Behaviors and Functional Status in Female Patients Diagnosed with Fibromyalgia

Figure 3. Correlations between the TFEQ scores, FIQ scores, and duration of complaints.


Increasing age was an independent predictor of the degree of consciously restricting eating.

In FMS patients, QoL and vitality are significantly affected [23]. Jafari et al. [24] reported that sleep quality, BMI, menstrual status, education level, and history of depression were associated with health-related quality of life (HRQoL) in FMS. Another study reported that pain severity, symptoms of anxiety and depression, and emotional coping strategies were important predictors of patients’ HRQoL [25]. Our study determined that eating behaviors of female patients with FMS did not correlate with QoL and functional status evaluated with the FIQ. Elk fury et al. [8] reported that FMS patients had marked signs of disordered eating. Fibromyalgia patients were found to have higher levels of emotional eating, weight and shape concerns, but the relationship between these high values and QoL, age or pain severity was not investigated. In the current study, we determined that the degree of conscious eating restriction correlated with increased age and pain severity and increasing age was a predictor of consciously restricting eating. This may be because patients with FMS may have thoughts that pain severity increases with overeating, or that older age and overeating adversely affect their health.

In a study evaluating the coexistence of FMS and mental disorders [26], where patients with FMS and those with rheumatoid arthritis were compared, there was found a significant comorbidity of anorexia nervosa and bulimia nervosa in FMS patients. Javaras et al. [27] evaluated obese or overweight individuals with current or past BED and reported that that disorder demonstrated significant comorbidity with FMS. However, Senna et al. [10] reported an association between obesity and depression in patients with FMS, and that this association was mediated by body weight and body image concern, BED, and low sleep quality. Therefore, the presence of mental diseases such as anxiety and depression in FMS patients was likely to affect their eating behavior [28]. In our study, patients with normal BAI and BDI scores and no history of mental illnesses were evaluated. The Uncontrolled Eating and Hunger Susceptibility scores were significantly higher in FMS patients, regardless of anxiety, depression, or history of mental diseases. Another study [8] that evaluated 20 FMS patients at the age of 46-55 years, with depressive symptoms, a potentially confounding variable that could distort the findings, being statistically controlled, found higher levels of emotional eating in fibromyalgia patients. In the aforementioned study, this result could be due to the small number of patients and significantly higher average age.

Obesity and overweight are two common comorbidities in female patients with FMS. Bennet et al. [5] determined that 43% of patients with FMS were obese and 70% were overweight, while Correa-Rodriguez et al. [6] reported that overweight/obesity rates were predominant in FMS patients, and that these patients had a lower QoL and functional status and higher symptom severity than normal-weight patients. In another study [7], obesity in FMS was reported to be associated with increased pain sensitivity, lower sleep quality, and decreased physical strength, and flexibility. In the present study, BMI and the proportion of overweight/obese patients were higher among patients with FMS as compared to healthy volunteers. The primary aim of our study was to evaluate eating behavior, and no relationship between the scores of eating behavior and BMI
was observed. Various factors may contribute to excess weight/obesity in FMS patients. Joustra et al. [29] reported that patients with FMS had low level of physical activity as compared to the general population. According to Okifuji et al. [30], hypothalamic-pituitary-adrenal axis disorders could mediate obesity in patients with FMS, while in another study [7], poor sleep quality was associated with obesity. Although we did not evaluate the aforementioned factors in our study, we found that patients with FMS experienced difficulty controlling their eating levels, had lack of control over food intake, and demonstrated a tendency to overeat when feeling hungry. This suggested that eating behaviors in FMS patients might influence their tendency to be overweight/obese. In a study conducted by Senna et al. [31], obese FMS patients were offered a calorie-restricted diet program, that resulted in weight loss. This situation reinforced our understanding of the effect of eating behaviors on obesity. Ruiz-Cabello et al. [32] have evaluated food consumption in FMS patients and reported that their nutritional choices may have an impact on their psychosocial lives. Daily fruit and vegetable intake and moderate fish consumption may be associated with more positive psychosocial outcomes in women with FMS, while consumption of cured meats and sweetened drinks are associated with worse optimism and depression scores. Almirall et al. [13] found that patients with FMS reduced the consumption of dairy products, bread/whole grain cereals, fresh fruit, and fish. In another study [12], the average consumption of cereals, fruit, sugar, alcohol and soft drinks was lower in FMS patients as compared to healthy volunteers. We have no data regarding this issue, as our study did not evaluate the nutritional choices and foods consumed by patients.

**Study Limitations**

The cross-sectional nature of present study did not allow to determine a causal relationship between FMS and eating behaviors. Furthermore, we did not evaluate whether eating behaviors changed during and after the treatment in patients who were treated for FMS. In this study, only the TFEQ was used to assess patients’ eating behaviors, and the results may vary depending on other eating behavior assessment tools. Many factors such as sleep, work routine, social factors can affect patients’ eating behavior, so it is difficult to eliminate all influencing factors. In addition, since data such as the TFEQ and FIQ scores are based on participants’ self-reports, bias cannot be overlooked. Finally, this study includes only women, and our findings cannot be generalized towards men with FMS.

**Conclusions**

Hunger susceptibility and uncontrolled eating behaviors are more common in female FMS patients. Cognitive Restraint was associated with increased age and pain severity and increasing age was a predictor of restraint. Determining the eating patterns of FMS patients and referring them to a specialist may facilitate treatment. There is a need for studies evaluating changes in eating behaviors of patients before and after FMS treatment along with changes in QoL.

**References**


The Relationship Between Eating Behaviors and Functional Status in Female Patients Diagnosed with Fibromyalgia — 8/8


Received: 2022-10-27
Revision Requested: 2022-12-02
Revision Received: 2023-01-01
Accepted: 2023-01-04