

The Effect of Probiotic Consumption Status and Quality of Life in Patients with Fibromyalgia

Seher ÇELİK ŞAHİN ¹, Tuğçe PASİN ², Seyit ANKARALI ³

ABSTRACT

Aim: Recent studies have suggested that disruptions in the gut microbiota could potentially contribute to the pathogenesis of chronic pain and fibromyalgia syndrome (FMS) by affecting the gut microbiota-brain axis. The increasing prevalence of fibromyalgia syndrome has prompted investigations into the impact of probiotic food consumption, which regulates the microbiota, on quality of life.

Material and Methods: The study included 99 patients diagnosed with fibromyalgia syndrome who presented to our Physical Medicine and Rehabilitation outpatient clinic. A questionnaire was administered to assess the patients' knowledge and consumption of probiotic foods, and the Short Form-12 Health Survey(SF-12) was used to gather data and assess health-related quality of life.

Results: Of the 99 patients who completed the questionnaire, 89 were female and 10 were male. In response to the question, "Do you know what probiotics are?" 7.4% of primary school graduates, 64.7% of high school graduates, and 78.6% of university graduates answered affirmatively. When asked, "Have you experienced any benefits from probiotic foods?" 21.2% responded positively, and among those who experienced benefits, the most common accompanying issue (37.04%) was Irritable Bowel Syndrome(İBS). Fibromyalgia syndrome patients who consumed yogurt as a probiotic had higher physical function subdomain scores on the SF-12 Health Survey.

Conclusion: The high level of education in FMS patients increased the awareness of probiotics. Probiotic consumption may have a improving effect on irritable bowel syndrome and constipation associated with FMS. Training on probiotics and increasing the frequency of use of probiotics, the quality of life of FMS patients can be increased and accompanying symptoms can be reduced.

Keywords: Fibromyalgia; probiotic; quality of life

Fibromiyalji Hastalarında Probiyotik Tüketim Durumu ve Yaşam Kalitesine Etkisi

ÖZ

Amaç: Bağırsak mikrobiyotası düzensizlikler son zamanlarda yapılan çalışmalarda beyin bağırsak aksını bozarak kronik ağrı ve fibromiyalji sendromunun(FMS) nedeni olabileceği belirtilmiştir. Görülme sıklığı artan fibromiyalji sendromunda mikrobiyotayı düzenleyen probiyotik besin tüketiminin yaşam kalitesine etkisi araştırılmıştır.

Gereç ve Yöntemler: Çalışmaya hastanemiz Fiziksel Tıp ve Rehabilitasyon polikliniğine başvuran fibromiyalji sendromu tanısı konulmuş 99 hasta alındı. Çalışmada fibromiyalji hastalarına probiyotik besinler hakkında bilgi düzeyleri ve tüketim durumlarının belirlenmesi anketi, Kısa Form-12 Sağlık (SF-12) Ölçeği uygulandı ve veri olarak kullanıldı.

Bulgular: Anketi dolduran 99 fibromiyalji sendromu tanısı konulan hastaların 89'u kadın, 10'u erkek hastadan oluşmaktaydı. "Probiyotik nedir biliyor musunuz?" sorusuna ilkökul mezunları %7,4, lise mezunları %64,7, üniversite mezunları %78,6 oranında evet yanıtını verdi. "Probiyotik besinlerden fayda gördünüz mü?" sorusuna %21,2 evet cevabı verildi ve fayda görenlere en sık eşlik eden problem (%37,04) İrritabl Bağırsak Sendromu (İBS) idi. Probiyotik olarak yoğurt tüketen fibromiyalji sendromu olan hastaların SF-12 Sağlık Ölçeğinin fiziksel fonksiyon alt birim puanları daha yüksek saptandı.

Sonuç: Fibromiyalji sendromlu tanıli hastalarda eğitim seviyesinin yüksekliği probiyotik bilinirliğini artırır. Fibromiyalji sendromuna eşlik eden iritabl bağırsak sendromu ve kabızlıkta probiyotik tüketimi iyileştirici etki gösterebilir. Bağırsak mikrobiyotasını düzenleyen probiyotikler hakkında eğitimler verilip, probiyotiklerin kullanım sıklığını artırılarak fibromiyalji sendromu olan hastaların yaşam kalitesi artabilir, eşlik eden semptomlar azalabilir.

Anahtar Kelimeler: Fibromiyalji; probiyotik; yaşam kalitesi

1 İstanbul Medeniyet University, Medical Faculty, Physiology Department, İstanbul, Turkey

2 Suleyman Yalcin Hospital, Physical Medicine and Therapy Department, İstanbul, Turkey

3 İstanbul Medeniyet University, Medical Faculty, Physiology Department, İstanbul, Turkey

Sorumlu Yazar / Corresponding Author: Tuğçe PASİN, e-mail: tugcepasin@hotmail.com

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INTRODUCTION

Probiotics are known as live microorganisms that provide health benefits when consumed in sufficient amounts (1). Research has demonstrated the effects of probiotics in preventing disorders of the gastrointestinal system, immune system diseases, allergies, eczema, and conditions like obesity (2-6). The positive effects of probiotic microorganisms on health were initially introduced by Russian scientist and Nobel laureate Elie Metchnikoff in 1907. In his study on the Bulgarian population, Metchnikoff observed that those who consumed fermented dairy products tended to be healthier and live longer. He attributed this phenomenon to a probiotic called *Lactobacillus bulgaricus* present in these products (7). The microorganisms in a healthy individual's gut flora are in a balanced state. Beneficial bacteria, which are predominantly present among these microorganisms, support the immune system. Probiotics contribute to the function of the intestinal barrier and provide protection against pathogenic agents. Factors such as irregular diet, stress, antibiotic use, and surgery can lead to a decrease in beneficial bacteria in the intestines and an increase in the proliferation of pathogenic bacteria on the intestinal mucosa. Probiotic microorganisms adhere to the intestinal mucosa, thereby playing a role in modulating the immune system and competing against pathogens (8).

For bacteria to be considered and identified as probiotic bacteria, they need to meet the following criteria (9):

It should be of human origin

There should be no data indicating that it causes infection. It should be resistant to bile salts and the low pH of the stomach.

It should be able to colonize the host organism.

It should be able to produce antimicrobial substances.

It should be able to improve the immune system.

Studies on probiotics have demonstrated their effectiveness in the treatment of gastrointestinal system disorders, particularly irritable bowel syndrome (IBS) (10).

Fibromyalgia syndrome (FMS) is a condition characterized by widespread pain and sensitivity, chronic fatigue, sleep problems, and various symptoms that collectively reduce the quality of life for patients, with no specific laboratory findings. Although the etiology and pathophysiology of FMS are not fully understood, a genetic background is believed to be involved (11). Depression, sleep disturbances, and gastrointestinal symptoms (such as irregular bowel movements, diarrhea, constipation, and irritable bowel syndrome) can accompany pain in patients (12). Recent studies have observed changes in gut microbiota, especially in conditions causing chronic pain like fibromyalgia (13). Additionally, probiotics that regulate gut microbiota have shown positive responses in the treatment of these conditions, such as fibromyalgia; however, more research is needed (14).

In this study, the aim is to investigate the level of knowledge about probiotic foods and the frequency of consumption among fibromyalgia patients and their impact on the quality of life.

MATERIAL AND METHODS

The study included a total of 99 patients, consisting of 10 males and 89 females, diagnosed with fibromyalgia syndrome (FMS) based on the American College of Rheumatology (ACR) 2010 diagnostic criteria, and registered at the Department of Physical Medicine and Rehabilitation, Duzce University Research and Application Hospital, between February 01 and May 01, 2018. Informed consent forms were provided to the participating patients, informing them that their information would be used for scientific publications. Ethical approval for the study was obtained from the Duzce University Faculty of Medicine Non-Interventional Health Research Ethics Committee on February 05, 2018, with approval number 2018/21.

To inquire about probiotic food consumption among FMS patients, the 'Questionnaire on the Knowledge Level and Consumption Patterns of Probiotic Foods Among Fibromyalgia Patients' was prepared. Additionally, the 'Short Form-12 Health Survey (SF-12)' was utilized to assess the quality of life. The SF-12 survey, developed for the purpose of measuring the quality of life, encompasses physical, social, and psychological sub-scales. Comprising 8 sub-dimensions and 12 questions, the SF-12 survey provides insight into an individual's self-perception and their ability to carry out daily activities. A Turkish version of the SF-12 survey has been validated and its reliability assessed (15).

Statistical Analysis

The descriptive characteristics of the obtained findings were calculated as mean \pm standard deviation, median (min-max), number, and percentage frequencies. The normal distribution fit of the measured numerical data was assessed using the Kolmogorov-Smirnov test. Differences between groups in terms of numerical data were compared using the Mann-Whitney U test. Relationships among categorical variables were evaluated using the chi-square test. A statistical significance level of $p < 0.05$ was adopted, and IBM SPSS 26.0 software package was employed for data analysis.

RESULTS

The study included a total of 99 patients with FMS, among whom 10 (10.1%) were male and 89 (89.9%) were female. Among them, 56 (56.6%) had completed primary education, 18 (18.2%) had completed high school, and 15 (15.2%) had a university degree. Regarding questions measuring probiotic knowledge, 23.2% of patients indicated awareness of the term 'probiotic,' and 21.2% reported perceiving benefits from probiotic foods. The relationship between participants' awareness of the probiotic term and their educational level is presented in Table 1. Specifically, 7.40% of primary education graduates (4 individuals) were aware of the probiotic term, compared to 35.30% of high school graduates (6 individuals), and 78.60% of university graduates (11 individuals). Examining Table 1, a significant increase in probiotic term awareness was observed with higher education levels.

Distribution of the frequency of probiotic food consumption among fibromyalgia patients is shown in Table 2. Analysis of probiotic food consumption frequency revealed that 54.5% consumed probiotic foods

once a day, 13.1% consumed them 2-3 times a day, 21.2% consumed them once a week, and 4% consumed them rarely.

Table 1. Distribution of awareness of the term 'probiotic' according to educational status

Educational status	Awareness of the Probiotic Term	Frequency (n)	Percent (%)	P
High School	Yes	6	35.30	0.001*
	No	11	64.70	
University	Yes	11	78.60	
	No	3	21.40	
Primary Education	Yes	4	7.40	
	No	50	92.60	

In the second phase of the study, potential significant differences among the mean scores of SF-12 subscales concerning the consumption of different types of probiotic foods, particularly yogurt, were investigated. The descriptive statistics and p-values are provided in Table 3. The results indicated a significant difference in the mean physical function score between individuals who consumed yogurt and those who did not (p=0.036). The

Table 2. Frequency of probiotic food consumption among fibromyalgia patients

	Frequency (n)	Percent (%)
Frequency of Probiotic Food Consumption	Once a day	54 54.5
	Two to three times a day	13 13.1
	Once a week	21 21.2
	Rarely	4 4
	Did not respond	7 7.07

physical function score average for yogurt consumers was 3.12±1.22, while for non-consumers, it was 2.00±0.00. However, no statistically significant differences were observed between yogurt consumers and non-consumers in terms of general health, physical role functioning, emotional role functioning, social functioning, pain, mental health, and vitality scores (p=0.351; p=0.206; p=0.694; p=0.766; p=0.758; p=0.349; p=0.182) (Table 3).

Table 3. Descriptive statistics of quality of life scores according to yogurt consumption status

Yogurt	Yes (n=57)		No (n=4)		p
	Mean±Standard Deviation	Median (Minimum-Maximum)	Mean±Standard Deviation	Median (Minimum-Maximum)	
General Health	3.92±0.67	4(2-5)	4.25±0.50	4 (4-5)	0.351
Physical Function	3.12±1.22	3(2-6)	2.00±0.00	2(2-2)	0.036*
Physical Role Functioning	2.54±0.86	2(2-4)	2.00±0.00	2(2-2)	0.206
Emotional Role Functioning	2.50±0.82	2(2-4)	2.50±0.57	2.5(2-3)	0.694
Social Function	3.30±1.30	3(1-5)	3.50±1.29	3.5(2-5)	0.766
Pain	3.24±0.91	3(1-5)	3.50±1.00	3(3-5)	0.758
Mental Health	6.40±1.27	6(4-9)	7.00±1.15	7(6-8)	0.349
Vitality	4.17 ±1.21	4(2-6)	5.00 ±0.81	5(4-6)	0.182

DISCUSSION

The prevalence of FMS is increasing and it is becoming more prominent on the list of diseases with higher frequency. This condition can negatively impact work life, daily activities, and overall quality of life. Among the most

common complaints of patients are sleep disturbances, morning fatigue, persistent pain, gastrointestinal disorders, depression, anxiety, irritability, and forgetfulness. In recent years, as with many other diseases, research is underway to explore alternative therapeutic and preventive

approaches to improve and maintain health for individuals with FMS. One such approach is the use of probiotics. However, studies on the consumption of probiotics by FMS patients are still relatively limited.

In a study by Babajimopoulos et al., it was found that 24% of participants were knowledgeable about the term 'probiotic' (16). Similarly, in our study, we found that 23.2% of FMS patients were aware of the probiotic term. Our study aligns with the existing literature.

Balkış reported that 70.2% of patients benefited from probiotic foods (8). In another study by Aydın et al., 51.2% of respondents reported benefiting from probiotics, and 47.6% believed they had a positive effect on the gastrointestinal system (17). In our study, 37.04% of patients stated that probiotics were beneficial for the intestines.

Al-Muammar et al. reported that awareness of probiotics increased with higher levels of education (18). Babajimopoulos et al. concluded that higher education levels were associated with greater knowledge about probiotics (16). However, a different study conducted by Anukam et al. on Nigerian healthcare workers found that 95.2% had no knowledge of probiotics (19). Our study indicates that awareness of probiotics increases with higher education levels. The survey revealed that 35.3% of high school graduates and 78.6% of university graduates were familiar with the probiotic term.

Concerning FMS patients' quality of life measured by the SF-12 Health Survey, yogurt consumption was associated with improved physical function. Yogurt is a potential source of probiotics and provides essential nutrients such as good dairy protein, calcium, magnesium, B-12 vitamins, and conjugated linoleic acid (20). Numerous studies on improving the health and nutrition status of the elderly have highlighted the significant role of yogurt, a probiotic, in this regard (21). Probiotic yogurt consumption has been linked to enhanced innate immunity, reduction in the duration and severity of respiratory infections, and regulation of the microbiota. Our study's findings align with similar studies, showing a significant relationship between probiotic consumption, specifically yogurt, and the physical function subscale.

Minerbi et al. found that the gut microbiome of FMS patients differed from that of the control group (22).

Limitations of the study include the fact that the sample covered only patients from Düzce province and its surrounding regions, limiting the generalizability of the findings. Furthermore, variations in the quantity and types of probiotic consumption among participants could potentially impact the results. Since the study is not prospective, caution should be exercised in generalizing the findings to the wider population.

In conclusion, the positive effects of probiotics on health are being unveiled through ongoing research. The probiotic awareness level among FMS patients was found to be 23.2%. This indicates that many FMS patients lack sufficient knowledge about probiotics, which in turn suggests their lack of awareness about the potential health benefits and how to use probiotics to address various health issues. To address this, healthcare professionals can provide education and recommendations about probiotics in addition to conventional treatments. Regular probiotic use may help alleviate FMS symptoms and offer support

in its management. Probiotics could be suggested for improving symptoms associated with fibromyalgia.

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