WENDLAND, Monika, JANIKOWSKA, Justyna, ŻAK-GONTARZ, Agata, PIOTROWSKA, Julia, DOMAŃSKA, Adrianna, ŁUBIŃSKA-KOWALSKA, Aleksandra, MINDA, Aleksandra, WITKOWSKA, Antonina Teresa, DŁUGOSZ, Krzysztof Julian, ZAPALSKA, Barbara Anna and WITKOWSKA, Adrianna. The influence of diet on patients suffering from Fibromyalgia Syndrome. Pharmacological and nonpharmacological treatment of tension-type headache. Quality in Sport. 2025;41:60298. eISSN 2450-3118.
https://doi.org/10.12775/QS.2025.41.60298
https://apcz.umk.pl/QS/article/view/60298

The journal has been awarded 20 points in the parametric evaluation by the Ministry of Higher Education and Science of Poland. This is according to the Annex to the announcement of the Minister of Higher Education and Science dated 05.01.2024, No. 32553. The journal has a Unique Identifier: 201398. Scientific disciplines assigned: Economics and Finance (Field of Social Sciences); Management and Quality Sciences (Field of Social Sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398. Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).
The authors declare that there is no conflict of interest regarding the publication of this paper.
Received: 14.04.2025. Revised: 30.04.2025. Accepted: 12.05.2025. Published: 12.05.2025.

The influence of diet on patients suffering from Fibromyalgia Syndrome

Monika Wendland, Justyna Janikowska, Agata Żak-Gontarz, Julia Piotrowska, Adrianna Domańska, Aleksandra Łubińska-Kowalska, Aleksandra Minda, Antonina Witkowska, Barbara Zapalska, Krzysztof Długosz, Adrianna Witkowska

Monika Wendland mail: monika.z.wendland@gmail.com Mazovian "Bródnowski" Hospital Ludwika Kondratowicza 8, 03-242 Warszawa;
ORCID: 0009-0009-6894-88460009-6894-88

Justyna Janikowska mail: justyna.janikowska@gmail.com National Medical Institute of the Ministry of the Interior and Administration in Warsaw PIM MSWiA ul. Wołoska 137 02-507 Warsaw, Poland; ORCID: 0009-0001-8277-0855

Agata Żak- Gontarz mail: agata.janina.zak@gmail.com Stefan Cardinal Wyszyński Provincial Specialist Hospital SPZOZ in Lublin, Aleja Kraśnicka 100, 20-718 Lublin, Poland; ORCID: 0009-0003-6533-9048

Julia Piotrowska mail: juliapiotrowska848@gmail.com Faculty of Medicine University of Warmia and Mazury, Aleja Warszawska 30, 10-082 Olsztyn, Poland ORCID: 0009-0006-3261-018X

Adrianna Domańska mail: adrianna.domanska21@gmail.com Faculty of Medicine University of Warmia and Mazury, Aleja Warszawska 30, 10-082 Olsztyn, Poland ORCID: 0009-0002-2720-2641

Aleksandra Łubińska-Kowalska mail: aleksandra.lubinska0@gmail.com Faculty of Medicine University of Warmia and Mazury, Aleja Warszawska 30, 10-082 Olsztyn, Poland ORCID: 0009-0007-2699-5965

Aleksandra Minda mail: aleksandra.m99@wp.pl Infant Jesus Teaching Hospital Williama Heerleina Lindleya 4,02-005 Warsaw, Poland; ORCID: 0009-0004-8862-712X

Antonina Witkowska mail: toniateresa99@gmail.com Praga Hospital of the Transfiguration of the Lord Aleja Solidarności 67 03-401 Warsaw, Poland ORCID: 0009-0007-9954-1462

Barbara Zapalska bzapalska17@gmail.com Independent Public Central Clinical Hospital of University Clinical Center of Medical University of Warsaw ul. Banacha 1A 02-097 Warszawa, Poland; ORCID 0009-0004-6417-877X

Krzysztof Długosz mail: krzysztofjdlugosz@gmail.com Uniwersytecki Szpital Kliniczny w Olsztynie: Olsztyn, Warmia-Masuria, Poland; ORCID: 0009-0000-8134-6115

Adrianna Witkowska mail: ada.dywity@gmail.com Faculty of Medicine University of Warmia and Mazury, Aleja Warszawska 30, 10-082 Olsztyn, Poland ORCID: 0009-0008-7314-8045

Abstract

Fibromyalgia is a chronic centralized pain syndrome characterized by disordered transmission of pain stimuli. The symptoms of fibromyalgia are very diverse and patients often experience musculoskeletal pain, fatigue, psychiatric disorders (especially depression), sleep disturbances

and gastrointestinal disorders. Since there is no cure for fibromyalgia, the proper diagnosis of the illness and consequently treating fibromyalgia effectively are key factors for reducing symptoms and improving a patient's quality of life. The review article shows different nutritional approaches on FM patients that have been researched in recent years and are key factor for integrated recovery plan and managing symptoms. Patients may benefit not only from proper treatment, physiotherapy and psychotherapy, but also from concrete nutritional approach which can influence inflammatory processes and central sensitization which are considered nowadays to play a major role in pathogenesis of the illness. There is not enough evidence that specific diet therapy is to be considered for the treatment of FM. However, overall studies revealed that weight control, anti-inflammatory diets, and vitamin D supplementation are beneficial in managing FM symptoms but further research is needed in this matter.

Materials and Methods

Systematic literature review was conducted using PubMed, Web of Science and Google Scholar databases. The search covered studies published between 2001 and 2024. The review was performed according to preferred reporting items for peer-reviewed articles, randomized controlled trials, systematic reviews and meta-analyses. This article is based on previously conducted studies and does not contain any studies with human participants or animals performed by any of the authors.

Keywords

fibromyalgia; anti-inflammatory diet; chronic pain; lifestyle modification; vitamin D

Introduction and purpose

Fibromyalgia(FM) is a chronic non-degenerative disease characterized by generalised muscle and joint pain, fatigue, morning stiffness, mental disorders(mainly depression), gastrointestinal(GI) disorders, Irritable Bowel Syndrome(IBS), mood and sleep disturbances(especially nonrestorative sleep) [1]. The symptoms of fibromyalgia are very diverse and often suggest diseases of internal organs. Although fibromyalgia itself is not life-threatening, it leads to a decrease in life's quality and impaired functioning. The etiology of fibromyalgia is still unclear: if central sensitization is considered to be the main mechanism involved, then many other factors, genetic, immunological, and hormonal, may play an important role. The diagnosis is typically clinical (there are no laboratory abnormalities) and the physician must concentrate on pain and on its features [1]. Since pharmacological approach very often is not sufficient for FM patients, comprehensive treatment, a healthy lifestyle including appropriate diet, various forms of rehabilitation and pharmacotherapy, can significantly improve the patient's comfort. The aim of this article was to synthesize the knowledge about the influence of nutritional approaches on patients suffering from fibromyalgia taking into consideration anti-inflammatory diets: plant-based diets, the low FODMAPs diet, the Mediterranean diet and also the hypocaloric diet, gluten-free diet and Vitamin D supplementation .

State of knowledge

Fibromyalgia is strictly connected to central sensitization phenomenon characterized by the dysfunction of neuro-circuits, which can be caused by inflammatory changes. This leads to chronic pain at the level of the locomotor system [2, 4]. Patient suffering from FM have elevated levels of inflammatory cytokines such as IL-6 and decreased levels of anti-inflammatory cytokines like IL-10 [5]. Through various mechanisms different nutritional approaches can be beneficial for FM patients, especially those influencing pro- and anti-inflammatory factors and sensitization that are currently considered to play a major role in pathogenesis.

Plant based diets (Vegetarian and vegan diet)

Patient's choice of diet can significantly influence their quality of life. There are different proinflammatory products that aggravate symptoms of FM (for example glutamate added to

many products) and therefore should be avoided by patients. There are also specific diets or products with anti-inflammatory properties. Plant-based diet in considered to be useful to reduce inflammaging in the long term by lowering serum concentration of C-reactive protein (CRP) and IL-6 level[6, 7]. It also decreases level of leukocytes and fibrynogen which can influence FM symptoms [8]. There is strict correlation between plant based diet and reduced level of oxidative stress and inflammation [9]. Study conducted at Alicante University in Spain shows that vegetarian diet improves FM patient's quality of life by lowering body weight, pain at rest and other maladies associated with this disease [10].

Diet low in foods rich in FODMAPs

Many patients suffering from fibromyalgia experience gastrointestinal problems. They can benefit from following a low-FODMAP (fermentable oligo-di-mono-saccharides and polyols) diet which excludes many products such as: all cereals except rice; cashew; all fruit other than banana, citrus, pineapple, red berries, strawberries and kiwi; all vegetables other than pumpkin, cabbage, lettuce, tomato, carrot and cucumber [11]. Patients following a low-FODMAP diet for one month in a longitudinal study using LFD interventions, performed on female patients diagnosed with FM for an average of 10 years, experienced alleviation in GI symptoms [12]. This diet also leads to calorie restriction which results in lower body weight which has a positive impact on pain interference, body satisfaction and quality of life [13].

Mediterranean diet

Patients having the habit of eating pro-inflammatory meals and foods with inadequate and insufficient nutritional content may experience worsening of their symptoms [14]. Following Mediterranean diet (which includes: whole grain, lean meats and fishes, olive oil, fruits and vegetables) can improve quality of life because of its significant anti-inflammatory properties [4, 14]. The Mediterranean diet is rich in omega-9-mono-unsaturated fatty acid oleic acid, which converted in the eicosatrienoic acid in the body inhibits synthesis of leukotriene B4 which is a potential chemoattractant, capable of inducing the production of reactive oxygen species and releasing the contents of lysosomes inducing inflammation [15].

Hypocaloric diet

Body weight loss is associated with reduction of many symptoms while obesity may worsen symptoms of FM [13]. In a pilot study low-calorie diet was tested on 42 patients suffering

from FM. After 20 weeks of intervention there was 4,4% reduction in body weight and patients reported improvement in pain symptoms, body satisfaction and quality of life [13]. Another study analyzing the effect of a 6 months hypocaloric diet resulted in improved sleep, quality of life and eliminating the symptoms of depression [16]. Weight loss in obese patients seems to be a significant factor leading to improvement of depression symptoms, sleep quality and pain management which leads to the conclusion that reducing body weight should be considered an important part of FM therapy [16].

Gluten-free diet

Since FM patients often suffer from gastrointestinal symptoms that significantly resemble gluten-related disorders such as nausea, abdominal pain, fatigue, tiredness, chronic pain and mood disturbance, there is a strong suggestion that there may be a possible coexistence of noncoeliac gluten sensitivity in such patients [17]. Consequently, a gluten-free diet could have a positive impact on such patients. A pilot study investigating the clinical impact of a 1 year gluten-free diet in a small sample of 7 patients with coeliac disease, IBS and FM showed that there was improvement of quality of life, cognitive function, pain symptoms and also tissue transglutaminase serum levels [18]. Significant improvement in IBS-related symptoms was found in the research investigating a 1 year gluten-free diet on 97 women with FM and IBS with or without lymphocytic enteritis. Those patients experience improvement in chronic abdominal pain, changes in intestinal habit, bloating, chronic widespread pain, generalized tender points, fatigue and restless sleep [19]. Comparable results were achieved in a 16.4 month gluten-free investigation on SM patients not suffering from coeliac disease [20]. In a 6 month intervention trial conducted on 75 FM patients with gluten sensitivity-like symptoms, comparing the effect of gluten-free diet and low-calorie diet, the results showed positive effects on symptoms in both dietary interventions. No diet was superior to the other in terms of reducing the number of symptoms [21].

Vitamin D Supplementation

There are some studies suggesting that FM patients should regularly supplement vitamin D. Vitamin D deficiency can influence and worsen chronic pain in those patients [22]. Furthermore, it can impact central sensitisation by having a role in regulating the synthesis of cytokines which enable interactions between neuronal and glial cells [23, 24]. Aproximately

40% of FM patients have been reported with vitamin D deficiency which suggests that supplementation can be beneficial for managing the symptoms [25]. The study conducted in 2008 investigated the influence of vitamin D supplementation on 90 FM patients suffering from mild to moderate vitamin D deficiency. Those patients were randomly assigned to receive 50,000 units of cholecalciferol (vitamin D_3) per week compared with a placebo. The results showed that after 8 weeks of intervention, the treated group presented a significant improvement in FM scores, in contrast to the placebo group [26]. Other studies evaluating the effect of vitamin D supplementation reported beneficial effects on FM patients [27]. The results suggested therapeutic benefits in the management of FM symptoms, especially pain reduction when patients were given a combination of vitamin D supplements and a conventional antidepressant [27].

Conclusion

Although there is no specific proven diet therapy for the treatment of FM, the literature review shows that specific diets can have significant impact on managing FM symptoms. Studies indicated that weight control, plant-based diets, the low FODMAPs diet, the Mediterranean diet, the hypocaloric diet, gluten-free diet and Vitamin D supplementation are beneficial in alleviating symptoms in patients with FM. More research on different nutritional approaches is needed, especially including larger groups of patients.

Disclosure

Authors' contributions

Conceptualisation: Monika Wendland, Antonina Teresa Witkowska

Methodology: Monika Wendland, Justyna Janikowska

Software: Aleksandra Minda

Check: Aleksandra Łubińska-Kowalska, Barbara Anna Zapalska

Formal analysis: Adrianna Domańska, Krzysztof Julian Długosz

Investigation: Julia Piotrowska, Agata Żak-Gontarz

Resources: Adrianna Witkowska, Julia Piotrowska

Writing-rough preparation: Agata Żak-Gontarz, Adrianna Domańska

Writing-review and editing: Krzysztof Julian Długosz, Adrianna Witkowska

Visualisation: Justyna Janikowska

Supervision: Antonina Teresa Witkowska Aleksandra Minda

Project administration: Barbara Anna Zapalska, Aleksandra Łubińska-Kowalska

All authors have read and agreed with the published version of the manuscript.

Funding statement: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Acknowledgment: Not applicable.

References

1. Bellato, Enrico, Eleonora Marini, Filippo Castoldi, Nicola Barbasetti, Lorenzo Mattei, Davide Edoardo Bonasia, and Davide Blonna. 2012. "Fibromyalgia Syndrome: Etiology, Pathogenesis, Diagnosis, and Treatment." *Pain Research and Treatment* 2012 (November): 426130. DOI: 10.1155/2012/426130

2.Siracusa, Rosalba, Rosanna Di Paola, Salvatore Cuzzocrea, and Daniela. Impellizzeri.2021. "Fibromyalgia: Pathogenesis, Mechanisms, Diagnosis and Treatment Options Update." *International Journal of Molecular Sciences* 22 (8): 3891. DOI: 10.3390/ijms22083891

3. Mease, Philip. 2005. "Fibromyalgia Syndrome: Review of Clinical Presentation, Pathogenesis, Outcome Measures, and Treatment." *The Journal of Rheumatology. Supplement* 75 (August): 6–21. PMID: 16078356.

4. Badaeva, Anastasiia, Alexey Danilov, Anastasiia Kosareva, Mariia Lepshina, Viacheslav Novikov, Yulia Vorobyeva, and Andrey Danilov. 2024. "Neuronutritional Approach to Fibromyalgia Management: A Narrative Review." *Pain and Therapy* 13 (5): 1047–61. DOI: 10.1007/s40122-024-00641-2

5. Wallace, D. J., M. Linker-Israeli, D. Hallegua, S. Silverman, D. Silver, and M. H. Weisman. 2001. “Cytokines Play an Aetiopathogenetic Role in Fibromyalgia: A Hypothesis and Pilot Study.” *Rheumatology (Oxford, England)* 40 (7): 743–49. DOI: 10.1093/rheumatology/40.7.743

6. Haghighatdoost, Fahimeh, Nick Bellissimo, Julia O. Totosy de Zepetnek, and Mohammad Hossein Rouhani. 2017. “Association of Vegetarian Diet with Inflammatory Biomarkers: A Systematic Review and Meta-Analysis of Observational Studies.” *Public Health Nutrition* 20 (15): 2713–21. DOI: 10.1017/S136898001700176

7. Melina, Vesanto, Winston Craig, and Susan Levin. 2016. “Position of the Academy of Nutrition and Dietetics: Vegetarian Diets.” *Journal of the Academy of Nutrition and Dietetics* 116 (12): 1970–80. DOI: 10.1016/j.jand.2016.09.025

8. Craddock, Joel C., Elizabeth P. Neale, Gregory E. Peoples, and Yasmine C. Probst. 2019. “Vegetarian-Based Dietary Patterns and Their Relation with Inflammatory and Immune Biomarkers: A Systematic Review and Meta-Analysis.” *Advances in Nutrition (Bethesda, Md.)* 10 (3): 433–51. DOI: 10.1093/advances/nmy103

9. Aleksandrova, Krasimira, Liselot Koelman, and Caue Egea Rodrigues. 2021. “Dietary Patterns and Biomarkers of Oxidative Stress and Inflammation: A Systematic Review of Observational and Intervention Studies.” *Redox Biology* 42 (101869): 101869. DOI: 10.1016/j.redox.2021.101869

10. Martínez-Rodríguez, Alejandro, Jacobo Á. Rubio-Arias, Domingo J. Ramos-Campo, Cristina Reche-García, Belén Leyva-Vela, and Yolanda Nadal-Nicolás. 2020. “Psychological and Sleep Effects of Tryptophan and Magnesium-Enriched Mediterranean Diet in Women with Fibromyalgia.” *International Journal of Environmental Research and Public Health* 17 (7): 2227. DOI: 10.3390/ijerph17072227

11. Silva, Ana Rita, Alexandra Bernardo, João Costa, Alexandra Cardoso, Paula Santos, Maria Fernanda de Mesquita, José Vaz Patto, Pedro Moreira, Maria Leonor Silva, and Patrícia Padrão. 2019. “Dietary Interventions in Fibromyalgia: A Systematic Review.” *Annals of Medicine* 51 (sup1): 2–14. DOI: 10.1080/07853890.2018.1564360

12. Marum, Ana Paula, Cátia Moreira, Fernando Saraiva, Pablo Tomas-Carus, and Catarina Sousa-Guerreiro. 2016. “A Low Fermentable Oligo-Di-Mono Saccharides and Polyols (FODMAP) Diet Reduced Pain and Improved Daily Life in Fibromyalgia Patients.” *Scandinavian Journal of Pain* 13 (October): 166–72. DOI: 10.1016/j.sjpain.2016.07.004

13. Shapiro, Jennifer R., Drew A. Anderson, and Sharon Danoff-Burg. 2005. “A Pilot Study of the Effects of Behavioral Weight Loss Treatment on Fibromyalgia Symptoms.” *Journal of Psychosomatic Research* 59 (5): 275–82. DOI: 10.1016/j.jpsychores.2005.06.081

14. Casini, Ilenia, Valeria Ladisa, Livio Clemente, Marianna Delussi, Elvira Rostanzo, Sofia Peparini, Anna Maria Aloisi, and Marina de Tommaso. 2024. “A Personalized Mediterranean Diet Improves Pain and Quality of Life in Patients with Fibromyalgia.” *Pain and Therapy* 13 (3): 609–20. DOI: 10.1007/s40122-024-00598-2

15. Berbert, Alair Alfredo, Cacilda Rosa Mitiko Kondo, Cecília Lisete Almendra, Tiemi Matsuo, and Isaias Dichi. 2005. “Supplementation of Fish Oil and Olive Oil in Patients with Rheumatoid Arthritis.” *Nutrition (Burbank, Los Angeles County, Calif.)* 21 (2): 131–36. DOI: 10.1016/j.nut.2004.03.023

16. Senna, Mohammed Kamal, Rehab Abd-El Raouf Sallam, Hala Salah Ashour, and Mohammed Elarman. 2012. “Effect of Weight Reduction on the Quality of Life in Obese Patients with Fibromyalgia Syndrome: A Randomized Controlled Trial.” *Clinical Rheumatology* 31 (11): 1591–97. DOI: 10.1007/s10067-012-2053-x

17. Aman, Mansoor M., R. Jason Yong, Alan David Kaye, and Richard D. Urman. 2018. “Evidence-Based Non-Pharmacological Therapies for Fibromyalgia.” *Current Pain and Headache Reports* 22 (5): 33. DOI: 10.1007/s11916-018-0688-2

18. Rodrigo, Luis, Ignacio Blanco, Julio Bobes, and Frederick J. de Serres. 2013. “Clinical Impact of a Gluten-Free Diet on Health-Related Quality of Life in Seven Fibromyalgia Syndrome Patients with Associated Celiac Disease.” *BMC Gastroenterology* 13 (1): 157. DOI: 10.1186/1471-230X-13-157

19. Rodrigo, Luis, Ignacio Blanco, Julio Bobes, and Frederick J. de Serres. 2014. “Effect of One Year of a Gluten-Free Diet on the Clinical Evolution of Irritable Bowel Syndrome plus

Fibromyalgia in Patients with Associated Lymphocytic Enteritis: A Case-Control Study." *Arthritis Research & Therapy* 16 (4): 421. DOI: 10.1186/s13075-014-0421-4

20. Isasi, Carlos, Isabel Colmenero, Fernando Casco, Eva Tejerina, Natalia Fernandez, José I. Serrano-Vela, Maria J. Castro, and Luis F. Villa. 2014. "Fibromyalgia and Non-Celiac Gluten Sensitivity: A Description with Remission of Fibromyalgia." *Rheumatology International* 34 (11): 1607–12. DOI: 10.1007/s00296-014-2990-6

21. Slim, Mahmoud, Elena P. Calandre, Juan M. Garcia-Leiva, Fernando Rico-Villademoros, Rocio Molina-Barea, Carmen M. Rodriguez-Lopez, and Piedad Morillas-Arques. 2017. "The Effects of a Gluten-Free Diet versus a Hypocaloric Diet among Patients with Fibromyalgia Experiencing Gluten Sensitivity-like Symptoms: A Pilot, Open-Label Randomized Clinical Trial." *Journal of Clinical Gastroenterology* 51 (6): 500–507. DOI: 10.1097/MCG.0000000000000651

22. Ellis, Shawn D., Sam T. Kelly, Jonathan H. Shurlock, and Alastair L. N. Hepburn. 2018. "The Role of Vitamin D Testing and Replacement in Fibromyalgia: A Systematic Literature Review." *BMC Rheumatology* 2 (1): 28. DOI: 10.1186/s41927-018-0035-6

23. Habib, Abdella M., Karim Nagi, Nagendra Babu Thillaiappan, Vijayakumar Sukumaran, and Saghir Akhtar. 2020. "Vitamin D and Its Potential Interplay with Pain Signaling Pathways." *Frontiers in Immunology* 11 (May): 820. DOI: 10.3389/fimmu.2020.00820

24. Holick, Michael F. 2007. "Vitamin D Deficiency." *The New England Journal of Medicine* 357 (3): 266–81. DOI: 10.3389/fimmu.2020.00820

25. Al-Allaf, A. W., P. A. Mole, C. R. Paterson, and T. Pullar. 2003. "Bone Health in Patients with Fibromyalgia." *Rheumatology (Oxford, England)* 42 (10): 1202–6. DOI: 10.1093/rheumatology/keg356

26. Arvold, David S., Marilyn J. Odean, Maude P. Dornfeld, Ronald R. Regal, Judith G. Arvold, Gene C. Karwoski, David J. Mast, Paul B. Sanford, and Robert J. Sjoberg. 2009. "Correlation of Symptoms with Vitamin D Deficiency and Symptom Response to Cholecalciferol Treatment: A Randomized Controlled Trial." *Endocrine Practice: Official Journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists* 15 (3): 203–12. DOI: 10.4158/EP.15.3.203

27. Mirzaei, Alireza, Mozhdeh Zabihiyeganeh, Seyed Adel Jahed, Elnaz Khiabani, Marzieh Nojomi, and Salman Ghaffari. 2018. “Effects of Vitamin D Optimization on Quality of Life of Patients with Fibromyalgia: A Randomized Controlled Trial.” *Medical Journal of the Islamic Republic of Iran* 32 (1): 29. DOI: 10.14196/mjiri.32.29