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ABSTRACT

Introduction: Patients with osteoarthritis not only ask about the impact of weight on their symptoms but also the impact of food on them. This includes foods that are described as either inflammatory or anti-inflammatory.

the aim of our study was to investigate the possible relationship between food and osteoarthritis symptoms.

Methods: The study was based on a questionnaire and was conducted on patients undergoing osteoarthritis treatment in our department between February and September 2022.

Results: We included 322 patients with a mean age of 59.57 ± 10.71, of whom 72.9% were women. The median duration of osteoarthritis was 4 years [2-10]. Only 7.9% reported that food affected their symptoms, with 4.4% experiencing improvement and 3.5% experiencing aggravation. The foods most often cited as improving joint symptoms were fish (1.2%), ginger (1.2%), and olive oil (1.2%), while red meat (1.2%) and soda (0.9%) were the most often cited as worsening symptoms. Approximately 2.2% of the patients exhibited food avoidance behaviors, while 3.7% adhered to specific diets and 1.3% tried fasting to alleviate joint symptoms.

In this multivariate analysis, we suggest that certain diet practices have an impact on osteoarthritis symptoms.

Conclusion: Our study found that only a minority of patients reported associations between some types of food and worsening or improving joint symptoms.

Keywords: osteoarthritis, foods, diet, symptoms

INTRODUCTION

Poor diet, physical inactivity, and obesity are now known to be associated with multiple comorbidities, including diabetes, cardiovascular disease, and chronic musculoskeletal conditions, including osteoarthritis [1,2]. An 18-month randomized controlled trial (RCT) showed that a reduction of at least 10% in body mass through diet, exercise, or a combination of both, improved pain and physical function in 454 elderly people with knee osteoarthritis [3]. Not surprisingly, weight loss through appropriate diet improves health in people with osteoarthritis. However, difficult, controversial, and topical questions remain about the possible influence of specific foods on osteoarthritis symptoms [4-6].

Despite advances in our understanding of the physiopathology of osteoarthritis, which is considered a major cause of morbidity and disability worldwide [7], no treatment has yet proven effective in the prevention, cure, or slowing of its progression. Long-term use of pharmacological agents, such as anti-inflammatory medications, has potential adverse effects that can lead to serious consequences, including gastrointestinal bleeding and adverse cardiac effects [8,9]. Current pharmacological therapies for osteoarthritis (OA) provide only palliative benefits because they do not address the underlying cause of cartilage degradation. Supplements containing nutrients such as chondroitin and glucosamine have been used to treat and alleviate the symptoms of osteoarthritis. However, there is currently insufficient evidence to support their effectiveness in treating OA. Therefore, we can only recommend medication to alleviate pain. In response to this pharmacological limitation, many observational and interventional studies have explored the potential of 'nutritional therapy'. Several studies suggest that diet may impact OA symptoms [10-13].

We conducted a cross-sectional study to investigate whether Moroccan patients report a relationship between certain foods and joint symptoms of osteoarthritis and to identify different types of foods that may increase or decrease symptoms, which could form a basis for nutrition strategies in the management of patients suffering from OA in the future.

PATIENTS AND METHOD

Study design

This is a cross-sectional study, conducted at the University Hospital of Tangier, between February and September 2022.

This study was approved by the University Hospital Center Ethics Committee of Tangier (CEHUT) (identification number: 01/22).

Patients

We included adult patients with all types of osteoarthritis who presented to the rheumatology department. Patients with cognitive disabilities preventing them from completing the questionnaires were the only ones excluded. All patients provided signed informed consent.

Questionnaire: Main and Other Variables

A standardized interview, based on a questionnaire elaborated by two professors of rheumatology (FZT and FEA), who are among the authors, was carried out. It was adapted to the Moroccan context based on previous literature [14,15]. To ensure its acceptability and clarity, a cognitive interview was performed with five people to obtain their opinion on each item of the questionnaire and whether it should be added or deleted. Some adjustments were then made. The questionnaire's final version underwent evaluation and approval.

It comprises two parts: the first part collects socio-demographic data, co-morbidities, and osteoarthritis impact characteristics. Pain was assessed using the Visual Analogue Scale (VAS), while the Womac knee and hip score measured functional disability in patients with knee or hip OA.

The second section included 12 closed questions with a variety of open and closed sub-questions. Patients were asked about their opinion regarding the impact of diet on their OA symptoms, their experiences with foods that either worsen or improve joint pain, and their attitudes towards the influence of different foods on their symptoms. The survey also recorded whether patients had tried specific diets or fasting as a means of relieving their symptoms. This section contains a list of 24 foods. Patients were asked to determine whether these foods worsened, improved, or had no effect on their joint problems.

Statistical analysis

Descriptive statistics were used to summarize the data. The statistical program IBM SPSS version 21.0 was used to conduct the analyses. Qualitative variables were expressed as numbers and percentages, medians and quartiles, or means and standard deviations, depending on their distribution. Statistical significance was considered present when $p < 0.05$. Binary logistic regression was used to evaluate the factors associated with reporting that diet affects joint symptoms.

RESULTS

Demographic and clinical characteristics of patients:

The mean age of the patients was 59.57±10.71 years, 47.2% had comorbidities, 69.4% were illiterate, and 91.3% were urban dwellers. The study included 322 patients with a median duration of osteoarthritis of 4 [2,10] years. Knee OA was present in 55% of the patients, followed by spine OA (27%), hand OA (17.1%), and ankle OA (0.3%). Table 1 presents the main sociodemographic and clinical data.

Impact of diet on OA joint symptoms:

Around 7.9% of the participants reported that food affected their symptoms. Of these, 4.4% reported an improvement, and 3.5% reported an aggravation. Approximately 2.2% of patients reported food avoidance behaviors, while 3.7% adopted some diets, and 1.3% had tried fasting to relieve joint symptoms (see Table 2).

Fish (1.2%), ginger (1.2%), and olive oil (1.2%) were the foods most often cited as improving joint symptoms, while red meat (1.2%) and soda (0.9%) were the most often cited as worsening symptoms (see Figure 1).

In the multivariate analysis, only the adoption of dietary practices was found to be associated with the belief that food affects patients' symptoms (OR: 114.074; 95% CI 7.103-1832.073; p=0.001) (see Table 3).

DISCUSSION

This study aimed to evaluate the impact of food on clinical symptoms in patients with OA. The main finding was that only 7.9% of the patients reported that food affected their symptoms, with 4.4% experiencing improvement and 3.5% experiencing aggravation. The adoption of dietary practices was the only factor associated with reporting that food affected their symptoms.

Several studies have reported a correlation between diet and symptoms of rheumatic diseases, including osteoarthritis (OA). In a survey conducted by Haugen et al., 742 patients participated, including 290 with rheumatoid arthritis, 51 with juvenile rheumatoid arthritis, 87 with ankylosing spondylitis, 51 with psoriatic arthropathy, 65 with primary fibromyalgia, and 34 with OA. Patients in this diverse group reported varying degrees of worsening disease symptoms after consuming some foods, such as red meat, alcohol, coffee and sugar. Next to 26% of patients with juvenile rheumatoid arthritis and 23% of patients with rheumatoid arthritis, ankylosing spondylitis, and primary fibromyalgia had tried a diet to relieve symptoms. Only 13% of patients with psoriatic arthropathy and 10% of patients with osteoarthritis had tried a diet for the same purpose. The study found that 46% of patients reported less pain and stiffness, while 36% reported reduced joint swelling [8].

Recent studies have shown that some food substances may have specific pharmacologic actions in OA disease, such as anti-inflammatory or antioxidant properties [9, 16, 17]. In our study on dietary lipids and osteoarthritis, fish (1.2%) and olive oil (1.2%) were the most commonly cited foods for improving joint symptoms. Although the percentage may seem low, it is actually the highest when placed in its context, since only a minority of patients reported a change in their symptoms through food. This observation is consistent with the existing literature, which suggests that higher intakes of monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA) are associated with reduced radiographic progression in knee OA [18]. For individuals with or at high risk of knee OA, a diet that reduces the ratio of ω-6 fatty acids to ω-3 fatty acids is likely to improve symptoms of osteoarthritis. This effect is similar to what is observed in rheumatoid arthritis, where inflammation related to circulating lipids is reduced [19,20]. It is a known fact that safflower oil and sunflower oil are rich in ω-6 fatty acids, while olive oil, which is rich in monounsaturated fats, contains only a small amount [21]. Fish is also a good source of omega 3, which may explain the reported positive effect on OA symptoms in some patients.

In our study, 1.2% of patients reported that ginger improved their symptoms, while the percentage did not exceed 0.9% for Curcuma. A systematic review assessed the positive therapeutic effects of Curcuma, a spice from the ginger family that is widely used in Indo-Asian cooking and traditional Eastern medicine, in patients with either OA or rheumatoid arthritis [22]. The authors concluded that there is evidence supporting the use of curcumin in the treatment of arthritis. A systematic review suggests that curcumin therapy may be a beneficial addition to the current treatment regimen for patients with knee osteoarthritis [23].

We also observed that the consumption of antioxidant-rich foods, such as dried fruit for vitamins A and E, and tomatoes and pomegranates for vitamin C, had varying effects on patients' symptoms. Specifically, the same percentage of patients reported both relief and worsening of symptoms when consuming dried fruit, which is also rich in carbohydrates. Only 0.3% of patients reported a beneficial effect on their symptoms when consuming tomatoes, while no effect was reported by patients when consuming pomegranates. Some authors have suggested that antioxidants, especially vitamin C, may delay the onset and progression of osteoarthritis, which is necessary for collagen formation [24-27].

In addition, red meat, tea, coffee and soda were perceived as aggravating foods. These results are consistent with a survey by Haugen et al, which included 742 patients with rheumatic diseases, 34 of whom were followed for osteoarthritis. The survey reported that the most common foods that aggravate symptoms in patients are red

meat, sugary sodas, sugary desserts, coffee, and alcohol [16].

As we described, patients who practiced dieting were more likely to report that diet affects joint symptoms. This suggests that these patients are more aware and attentive to the potential effects of food on their symptoms.

Furthermore, a small percentage (1.3%) of patients were experimented with fasting to relieve joint symptoms. Although there are various fasting schedules, they are typically intermittent and primarily used in weight loss plans, particularly for metabolic osteoarthritis [28].

Limitations of the Study: The cross-sectional methodology and the use of a non-validated questionnaire were limitations of our study. Additionally, we only tested 24 foods for their impact on joint symptoms, excluding vegetables, sesame, and other known vitamin K-rich foods that play a role in bone and cartilage health [29-34].

CONCLUSION

Nutritional strategies may be an attractive and potentially promising approach to managing osteoarthritis, if their effectiveness is proven. Our study found that only a minority of patients reported associations between certain foods and worsening or improving joint symptoms, which appeared to be mostly related to personal dietary practices. Some foods, particularly those of Mediterranean origin such as olive oil and fish, have been found to alleviate joint pain. On the other hand, foods high in protein, such as red meat, have been shown to aggravate joint pain. However, the influence of diet on OA remains a controversial issue. Studies in this area are scarce, and future research should focus on food therapy.

REFERENCES

[1] Briggs AM, Cross MJ, Hoy DG, et al. Musculoskeletal health conditions represent a globalthreat to healthy aging: a report for the 2015 world health organization world report on ageing and health. Gerontologist. 2016;56(S2):S243–255. doi: 10.1093/geront/gnw002.

[2] Shlisky J, Bloom DE, Beaudreault AR, et al. Nutritional considerations for healthy aging and reduction in age-related chronic disease. Adv Nutr. 2017;8:17–26. doi: 10.3945/an.116.013474

[3] Messier SP, Mihalko SL, Legault C, et al. Effects of intensive diet and exercise on kneejoint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: the IDEA randomized clinical trial. JAMA. 2013;310:1263–1273. doi: 10.1001/jama.2013.277669

[4] Chopp-Hurley JN, Wiebenga EG, Keller HH, and Maly MR. Diet and Nutrition Risk Affect Mobility and General Health in Osteoarthritis: Data from the Canadian Longitudinal Study onAging. J Gerontol A Biol Sci Med Sci. 2020 Oct 15;75(11):2147-2155.

[5] Messier SP, Mihalko SL, Legault C, et al. Effects of intensive diet and exercise on kneejoint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: the IDEA randomized clinical trial. JAMA. 2013;310:1263–1273. doi: 10.1001/jama.2013.277669.

[6] Dai Z, Lu N, Niu J, Felson DT, Zhang Y. Dietary Fiber Intake in Relation to Knee Pain Trajectory. Arthritis Care Res (Hoboken). 2017 Sep;69(9):1331-1339. doi: 10.1002/acr.23158.

[7]Jeffries MA. Osteoarthritis year in review 2018: genetics and epigenetics. OsteoarthritisCartilage 2019;27:371–7

[8] Haugen M, Kjeldsen-Kragh J, Nordvag BY, Forre O (1991) Diet and diseasesymptoms in rheumatic diseases-results of a questionnaire based survey. Clin Rheumatol1991; 10: 401-7. https://doi.org/10.1007/bf02206660

[9] Soo May L, Sanip Z, Ahmed Shokri A, Abdul Kadir A, Md Lazin MR. The effects of Momordica charantia (bitter melon) supplementation in patients with primary knee osteoarthritis: A single-blinded, randomized controlled trial. Complement Ther Clin Pract. 2018Aug;32:181-186. doi: 10.1016/j.ctcp.2018.06.012.

[10] Thomas S, Browne H, Mobasheri A, et al. What is the evidence for a role for diet

and nutrition in osteoarthritis? Rheumatology 2018;57:iv61–74.Fuggle NR, Cooper C, Oreffo ROC, Price AJ, Kaux JF, Maheu E, Cutolo M, Honvo G, Conaghan PG, Berenbaum F, Branco J, Brandi ML, Cortet B, Veronese N, Kurth AA, MatijevicR, Roth R, Pelletier JP, Martel-Pelletier J, Vlaskovska M, Thomas T, Lems WF, Al-Daghri N, Bruyère O, Rizzoli R, Kanis JA, Reginster JY. Alternative and complementary therapies in osteoarthritis and cartilage repair. Aging Clin Exp Res. 2020 Apr;32(4):547-560. doi: 10.1007/s40520-020-01515-1.

[11] Mathieu S, Soubrier M, Peirs C, Monfoulet LE, Boirie Y, Tournadre A. A Meta-Analysis of the Impact of Nutritional Supplementation on Osteoarthritis Symptoms. Nutrients. 2022 Apr12;14(8):1607. doi: 10.3390/nu14081607.

[12] Elma Ö, Yilmaz ST, Deliens T, Coppieters I, Clarys P, Nijs J, Malfliet A. Do Nutritional Factors Interact with Chronic Musculoskeletal Pain? A Systematic Review. J Clin Med. 2020 Mar 5;9(3):702. doi: 10.3390/jcm9030702. PMID: 32150934; PMCID: PMC7141322.

[13] Haugen M, Kjeldsen-Kragh J, Nordvåg BY, Førre O. Diet and disease symptoms in rheumatic diseases--results of a questionnaire based survey. Clin Rheumatol. 1991 Dec;10(4):401-7. doi: 10.1007/BF02206660. PMID: 1802495.

[14] S.B. Tanner, L.F. Callahan, R. Panush, T. Pincus. Dietary and allergic associations with rheumatoid arthritis: self-report of 704 patients. Arthritis Rheum, 3 (1990), pp. 189- 195, 10.1002/art.1790030406

[15] Du C, Smith A, Avalos M, South S, Crabtree K, Wang W, Kwon YH, Vijayagopal P, Juma S. Blueberries Improve Pain, Gait Performance, and Inflammation in Individuals with Symptomatic Knee Osteoarthritis. Nutrients. 2019 Jan 29;11(2):290. doi: 10.3390/nu11020290.

[16] Atabaki M, Shariati-Sarabi Z, Tavakkol-Afshari J, Mohammadi M. Significant immunomodulatory properties of curcumin in patients with osteoarthritis; a successful clinicaltrial in Iran. Int Immunopharmacol. 2020 Aug;85:106607. doi: 10.1016/j.

[17] Lu B, Driban J, Xu C et al. Dietary fat and progression of knee osteoarthritis dietary fat intake and radiographic progression of knee osteoarthritis: data from the Osteoarthritis Initiative. Arthritis Care Res 2017;69:368-75.

[18] Calder PC. n-3 Polyunsaturated fatty acids, inflammation, and inflammatory diseases. AmJ Clin Nutr 2006;83(6 Suppl):1505S19S.

[19] Schönenberger KA, Schüpfer AC, Gloy VL, Hasler P, Stanga Z, Kaegi-Braun N,

Reber E. Effect of Anti-Inflammatory Diets on Pain in Rheumatoid Arthritis: A Systematic Review and Meta-Analysis. Nutrients. 2021 Nov 24;13(12):4221. doi: 10.3390/nu13124221. PMID: 34959772; PMCID: PMC8706441.

[20] Orsavova J, Misurcova L, Ambrozova JV, Vicha R, Mlcek J. Fatty acid composition of vegetable oils and its contribution to dietary energy intake and dependence of cardiovascular mortality on dietary intake of fatty acids. Int J Mol Sci 2015;16:12871-90.

[21] Daily JW, Yang M, Park S. Efficacy of Turmeric extracts and curcumin for alleviating the symptoms of joint arthritis: a systematic review and meta-analysis of randomized clinical trials.J Med Food 2016;19:717–29.

[22] Paultre K, Cade W , Hernandez D, Reynolds DJ, Greif D, Best TM .Therapeutic effects of turmeric or curcumin extract on pain and function for individuals with knee osteoarthritis: a systematic review. BMJ Open Sport Exerc Med. 2021 Jan 13;7(1):e000935.doi: 10.1136/bmjsem-2020-000935.

[23] Grover AK, Samson SE. Benefits of antioxidant supplements for knee osteoarthritis:rationale and reality. Nutr J 2016;15:1.

[24] Henrotin Y, Kurz B. Antioxidant to treat osteoarthritis: dream or reality? Curr Drug Targets2007;8:347-57].

[25] Grover AK, Samson SE. Benefits of antioxidant supplements for knee osteoarthritis:rationale and reality. Nutr J 2016;15:1.

[26] Li Y, Schellhorn HP. New developments and novel therapeutic perspectives for vitamin C. J Nutr 2007;137:217184].

[27] Babu S, Vaish A, Vaishya R, Agarwal A. Can intermittent fasting be helpful for knee osteoarthritis? J Clin Orthop Trauma. 2021 May; 16: 70–74. Published online 2021 Jan23. doi: 10.1016/j.jcot.2020.12.020

[28] Skoldstam L, Hagfors L, Johansson G. An experimentalstudy of a Mediterraneandiet intervention for patients withrheumatoidarthritis. Ann Rheum Dis 2003;62:208e14. https://doi.org/10.1136/ard.62.3.208.

[29] Eftekhar Sadat B, Khadem Haghighian M, Alipoor B, Malek Mahdavi A, Asghari Jafarabadi M, Moghaddam A. Effects of sesame seed supplementation on clinical signs and symptoms in patients with knee osteoarthritis. Int J Rheum Dis. 2013 Oct;16(5):578-82. doi: 10.1111/1756-185X.12133. Epub 2013 Jun 20. PMID: 24164846.

[30] Neogi T, Booth SL, Zhang YQ et al. Low vitamin K status is associated with osteoarthritisin the hand and knee. Arthritis Rheum 2006;54:125561.

[31] Oka H, Akune T, Muraki S et al. Association of low dietary vitamin K intake with radiographic knee osteoarthritis in the Japanese elderly population: dietary survey in a population-based cohort of the ROAD study. J Orthop Sci 2009;14:68792.

[32] Shea MK, Kritchevsky SB, Hsu FC et al. The association between vitamin K status and knee osteoarthritis features in older adults: the Health, Aging and Body Composition Study. Osteoarthritis Cartilage 2015;23:3708.

[33] Misra D, Booth SL, Tolstykh I et al. Vitamin K deficiency is associated with incident kneeosteoarthritis. Am J Med 2013;126:2438.

Tables:

Table 1: Demographic and clinical characteristics of the study population

	322 patients (n= 322)
Age, years (± SD) *	59.57± 10.71
Gender (%)†	Female 72.9%
	Male 27.1%
Comorbidity (%)†	47.2%
Educational level (%)†	
Illiterate	69.4%
Marital status (%)†	
Married	73.4%
Urban (%)†	91.3%
Duration of evolution (years) ‡	4 [2-10]
VAS pain	5.4±2
Treatement (%)†	
No treatment	27.3%
NSAIDs	53.1%
Analgesics	72.7%
Localization of osteoarthritis (%)†	
Knee	55%
Spine	27%
Digital	17.1%
Ankle	0.3%

*: Data presented as mean ± SD. † : Data Presented as a percentage (%). ‡: Data Presented as median.

Table 2: patients' responses regarding the relation between diet, fasting and joint symptoms.

	322 patients n=322
Patients report that food had an effect on their OA:	7.9%
- Aggravation	3.5%
- Improvement	4.4%
Patients report that they develop avoidance behaviour for particular foods.	2.2%
Patients adopt certain diets to relieve joint symptoms.	3.7%
Patients believe fasting may affect their symptoms.	5%
Patients have already tried fasting in an attempt to relieve joint symptoms.	1.3%

Table 3: Uni and multivariate analysis for the influence of diet on joint symptoms

|	Univariate analysis		Multivariate analysis	
	OR (95% CI)	P	OR (95% CI)	P
Age	1.049[1.003-1.096]	0.035	_	_
Gender	1.851 [0.704-4.865]	0.212	_	_
			_	_
Educational level	0.482[0.323-0.719]	0.000	_	_
			_	_
Comorbidity	1.433[0.541-3.795]	0.469	_	_
evolution	1.001[0.995-1.007]	0.764	_	_
VAS pain	1.127 [0.888-1.430]	0.327	_	_
BMI	1.120[1.028-1.220]	0.01	_	_
Adoption of dietary practices	38.295[10.415-139.051]	0.000	42.321[6.128-292.269]	0.000
The practice of fasting	19.200[2.528-145.830]	0.004	_	_
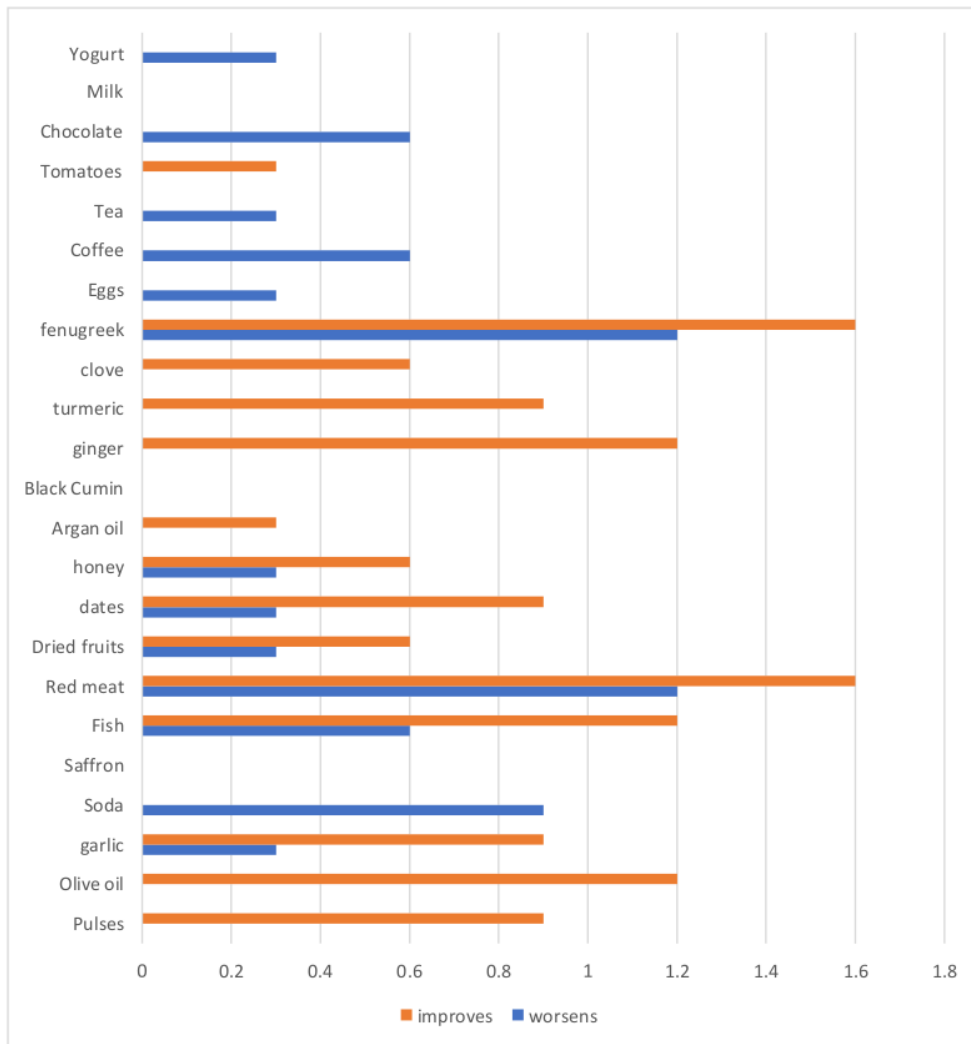
Figure 1: foods reported to aggravate or ameliorate joint symptoms in percentage %