

Fibromyalgia: is there a link between symptoms and foods consumed? - a survey of Fibromyalgia sufferers

Abstract

Introduction

There have been many studies looking at diet and Fibromyalgia (FMS) and much anecdotal evidence from both FMS patients and practitioners that the consumption of certain foods or food groups worsen or ameliorate the symptoms of FMS. This study aims, via the use of a questionnaire, to investigate the link between foods consumed and FMS patients' perception of their affect on FMS symptoms.

Methods

The questionnaire was emailed to qualifying members of FMS support groups and was also included on the websites of these support groups. To qualify for inclusion in the study, participants had to be female, living in the SE of England, aged between 25 and 60 years old, who had suffered with the symptoms of FMS for at least 1 year and who had been diagnosed by a medical professional. Completed questionnaires were returned to an email address at The Centre for Nutrition Education and were then passed to the researcher for analysis.

Results & Analysis

Of those participants who answered these particular questions, the foods which brought the highest rates of perceived negative response to symptoms were; potatoes 40%, artificial sweetener 43%, beer/cider 45%, white wine 50%, aspartame 50%, sugar 53%, red wine 55%, mono-sodium glutamate 56%, coffee 58%, and bread 59%. chicken, oily fish, white fish, nuts (unsalted), seeds and chocolate all positively affected the perceived symptoms of more than 10% of participants, who answered these questions.

Conclusions

A large proportion of the FMS patients surveyed in this study perceived that many of the foods contained in the survey affected their FMS symptoms either negatively or positively.

Introduction

Fibromyalgia (FMS) is thought to affect between 1 – 12% of the total population and female sufferers outnumber male sufferers by a ratio of between 5:1 and 20:1. It appears not to have an ethnic bias and exists in most countries of the world. It is one of the 3 most common diagnoses made by Rheumatologists, coming second only to Osteoarthritis (Berne '01). FMS is usually considered a disorder of women aged 20 to 50 years; however, it has also been observed in males, children, adolescents, and older people. FMS is more common in relatives of patients with FMS, suggesting the contribution of both genetic and environmental factors (Neumann '03). Symptoms include chronic widespread pain in the left, right, upper and lower parts of the body, fatigue, stiffness, headache, sleep disturbance, IBS, depression, cognitive dysfunction, anxiety, intolerance to cold, exercise intolerance and dysmenorrhoea (Chakrabarty '07). FMS involves the fibrous tissues in the body and pain comes from the connective tissues, such as the muscles, tendons, and ligaments. FMS does not involve the joints, as does rheumatoid arthritis and osteoarthritis (UK Fibromyalgia).

The causes of FMS are as yet unknown however research indicates many possible triggers that may predispose an individual to develop the condition (UK Fibromyalgia) and these include; stress, depression, infection or illness, poor diet and nutritional deficiencies, accumulation of toxins, weakened or overwhelmed immune system (Elrod '02), food allergies (fibromyalgia-symptoms.org '08), anxiety, serotonin disruption and low levels of growth hormone (University of Maryland '08). Fibromyalgia also appears to cluster in families, suggesting a strong genetic predisposition (Bennett '04) with a family history of FMS being found in 30% of patients (Berne '01). It is possible that the cause involves one or more factors and thus the source or cause may always be elusive.

The diagnostic criteria for FMS is based on the use of The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia (Wolfe et al '90) however diagnosis can prove difficult as fibromyalgia shares a variety of symptoms in common with many other overlapping conditions and diagnosis often does not occur until the condition has been present for many years (Berne '01). Once diagnosed, conventional treatment is usually geared towards medication to reduce pain and increase the quality of sleep.

This approach often becomes ineffective over time (Elrod '02). The main medications prescribed are painkillers or antidepressants. Conventional pharmacologic treatment alone often proves frustrating for patients who then turn to alternative practitioners and therapies in order to manage their symptoms. Recent evidence shows that the optimal intervention is an approach that also includes non-pharmacologic treatments (Sim '02). Research at the Mayo Clinic in 2005 looked to evaluate the frequency and pattern of complementary and alternative medicine (CAM) use in patients referred to a FMS treatment programme. The study found that CAM use was common with 98 percent of patients having used some type of CAM therapy during the previous 6 months. The 10 most frequently used CAM treatments were; exercise for a specific medical problem (48%), spiritual healing (inc. prayers) (45%), massage therapy (44%), chiropractic treatments (37%), vitamin C (35%), vitamin E (31%), magnesium (29%), vitamin B complex (25%), green tea (24%), and weight-loss programmes (20%) (Wahner-Roedler '05). A 1996 study on alternative medicine use in fibromyalgia syndrome concluded that alternative medicine practices were currently being used by almost all FMS patients. This observation might indicate that traditional medical therapies are inadequate in providing symptomatic relief to FMS patients. (Piro-Boisset et al '96)

Diet and nutrition appear to feature in many fibromyalgia patients' strategies and although there is little clinical research, Nutritional Therapy has been shown anecdotally to have a beneficial effect on the symptoms of fibromyalgia. The approach includes; balancing blood sugar levels, ensuring an adequate intake of proteins, identifying and reducing allergens, ensuring an adequate supply of essential vitamins and minerals, ensuring an adequate supply of essential fats, reducing saturated and trans fats, reducing stimulants such as caffeine and alcohol, reducing additives and preservatives – particularly mono-sodium glutamate (MSG) and aspartame, minimising foods high in arachidonic acid which increase the production of pro-inflammatory prostoglandins, healing a potentially 'leaky gut', managing stress and addressing small bowel bacterial overgrowth: dysbiosis (Lowe '06 and Elrod '02). Recent research involving fibromyalgia patients found that 77% in one study and 100% in another study had dysbiosis (Sult '06).

FMS, chronic fatigue syndrome and IBS often co-exist. A 2000 study published in The Archives of Internal Medicine found that the overlap between FMS and IBS was as high as 77% (Aaron '00) and foods and allergens that affect one may have an effect on the other.

Despite the fact that there is no accepted "diet for fibromyalgia", there have been many studies looking at diet and FMS. In particular Kaartinen in 2000 found that a strict, low-salt, uncooked vegan diet rich in lactobacteria for a three month period brought significant improvements in visual analogue scale of pain, joint stiffness, quality of sleep, health assessment questionnaire, general health questionnaire, and a rheumatologist's own questionnaire (Kaartinen et al '00).

The connection between dietary and lifestyle habits with chronic diseases has become increasingly strong in recent years. Most of the research has been towards the prevention of chronic disease rather than toward its treatment (Donaldson *et al* '01). However, a literary review by Logan in 2003 found that:

‘The role of diet in the treatment of FM has been the subject of a small but growing body of research, with results showing benefits in pain reduction, sleep quality, and general health. Based on this review of the literature, it can be concluded that dietary modification may provide relief in a subset of FM patients and certainly warrants further investigation’ (Logan '03).

Anecdotal evidence from patients and practitioners also show that FMS patients report that the consumption of certain foods have an effect on the amelioration or worsening of symptoms. The aim of this research study was to identify, through a survey of FMS patients, which foods contribute to a perceived change in symptoms.

Methods

Research was carried out through the use of a questionnaire which was emailed to FMS patients through various FMS support Groups. This was decided to be the most effective way of contacting FMS patients within the time and budget constraints allowed. The Fibromyalgia Association UK (FMAUK) was contacted and agreed to send the survey to members who fit the study's criteria, this being female, aged between 25 and 60 years old, who had suffered with the symptoms of FMS for at least 1 year and who lived in the south east of England. This criteria was decided upon as it was believed that this would restrict responses to a manageable level for a single researcher to undertake analysis of the data. The FMAUK support groups of South Buckinghamshire, Hampshire, Berkshire and Surrey & Sussex emailed their qualifying members and FMAUK posted the survey on their main website to reach a wider qualifying audience. In addition to FMAUK, Fibro Action and The Tried and Tested Fibromyalgia Support Group members were informed of the questionnaire and asked to participate through the relevant website. As there was no direct contact with participants, a covering letter from the researcher which explained why the survey was being carried out and its aims was included with the emails and on the websites (Appendix 1). Informed consent was assumed to have been given by participant's completion of the questionnaire. Ethics committee approval was obtained from the Natural Sciences sub-committee of Middlesex University.

To ensure anonymity no direct contact was made between the researcher and participants. Instead, an email address at The Centre for Nutrition Education was used and completed surveys were then passed from here onto the researcher.

The 1st section of the questionnaire was designed to verify that participants were eligible to take part in the study. Participants were asked if they were male or female, their age, which county of England they live in, how long they had suffered from FMS, if they had been diagnosed as having FMS, by whom they had been diagnosed and when they were diagnosed. Participants were also asked if they suffered from any other clinically diagnosed conditions, if they were currently taking medication and if so what medication and lastly if they were currently taking any nutritional supplements. This last question was designed to see if the participants had any prior knowledge of nutrition or supplements being recommended for FMS.

The questionnaire was initially piloted with local friends and family of the researcher to check that the language was not ambiguous, the survey not too long and that the form boxes worked. Participants completing the pilot study were asked; how long the survey took to complete, were the instructions clear, were any questions ambiguous in meaning and was the layout of the questionnaire appealing. Following the piloting, the questionnaire was altered to include which symptoms participants felt changed with each food consumed.

Participants

It is estimated that the survey was emailed or brought to the attention of approximately 300 potential participants. 30 questionnaires were completed and returned to the researcher.

All participants were female and had all been diagnosed with FMS by a medical practitioner.

Practitioner	Rheumatologist	GP	Pain Clinic	Orthopaedic consultant	Neurologist
Number of participants	20 (66.67%)	6 (20%)	2 (6.67%)	1 (3.33%)	1 (3.33%)

Participants were between the ages of 26 and 60 with a mean age of 42.

Age range	25-35	35-45	45-55	55-60
No. of participants	7	13	6	4

Participants came from the following South East England locations; Buckinghamshire, Berkshire, Oxfordshire, Hampshire inc. the Isle of Wight, East Sussex, London, Hertfordshire, Kent, Middlesex, East Anglia and Surrey.

73% of participants suffered from other medically diagnosed conditions including; Hypothyroidism, Colitis, Crohn’s Disease, Epilepsy, Asthma, Rheumatoid Arthritis, High Cholesterol, Osteo-Arthritis and Carpal Tunnel Syndrome. 10% of the FMS participants suffered from hypothyroidism, 20% suffered from asthma and 33% suffered from IBS/IBD. These may be statistically significant figures as IBS usually affects only 5-11% of the general population (Spiller et al ’07) and the prevalence of doctor diagnosed Asthma in adults is approximately 7% of the general population (Netdoctor ’04). Perhaps this may be suggestive of increased sensitivity to allergens in patients with FMS. However, more research would be required to verify this.

83% of participants were currently taking prescribed medication. Of this 44% were prescribed Ameritriptyline, 20% were taking Co-Codamol, 10% were taking Tramadol. Other medications being taken included; Meloxicam, Co-proximal, baclofen, ferrous gluconate, mesalazine, carbamazepine, lansoprazole, diazepam, temazepam amongst others.

53% of participants were currently taking nutritional supplements.

Supplement	Multi-Vits & Mins	EFA's	B Vits	Magnesium	Probiotic
No. of participants	8	10	5	3	2

Single participants reported taking other nutritional supplements including Zinc, Vitamin C, Garlic, Iron, Vitamin D3, CoQ10, Cherry Active, L-Arginine, Calcium and Aloe Vera gel.

Initially the pilot questionnaire asked the participants to score the changes they noticed when consuming a food between a range of 1 – 10 however, as the purpose of the survey was to try to identify foods which have an effect on symptoms, not how great that effect was, particularly as the change in symptoms potentially could be different for each individual completing the questionnaire, it was decided to keep the answers to a simple choice of 3 tick box answers with a choice of ‘better’ ‘worse’ or ‘no change’ for each food listed.

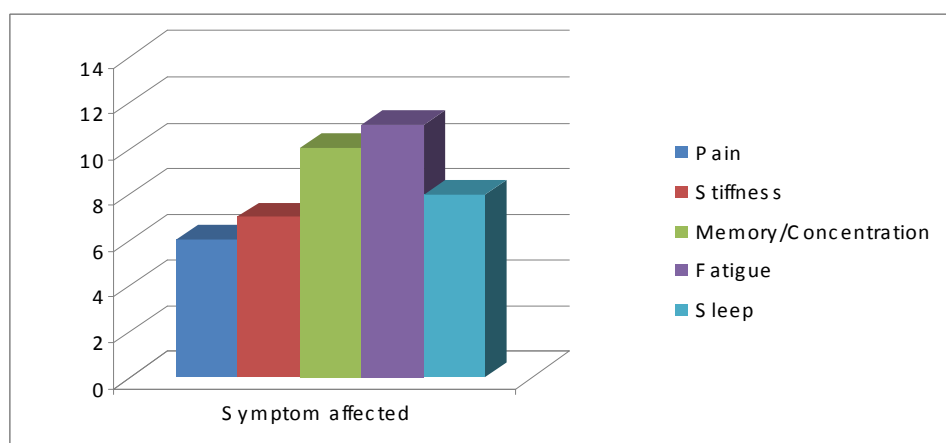
The questionnaire (Appendix 2) also asked the participants, if they did notice a change in symptoms when consuming a certain food, to tick which symptoms had changed from a choice of ‘pain’ ‘stiffness’ ‘memory/concentration’ ‘fatigue’ and ‘sleep’. The questionnaire listed 31 foods and beverages, some of which were known to be possible triggers and some of which had no such information concerning their consumption. This was done so as not to lead the participants to one particular food or another.

Results

Sugar

26 participants answered this question of which 54% said that symptoms worsened when they consumed sugar, 42% said that they felt no change in symptoms. 1 participant (number 27) felt that her symptoms improved when she consumed sugar.

Graph 1:- Symptoms negatively affected following the consumption of sugar. n=14

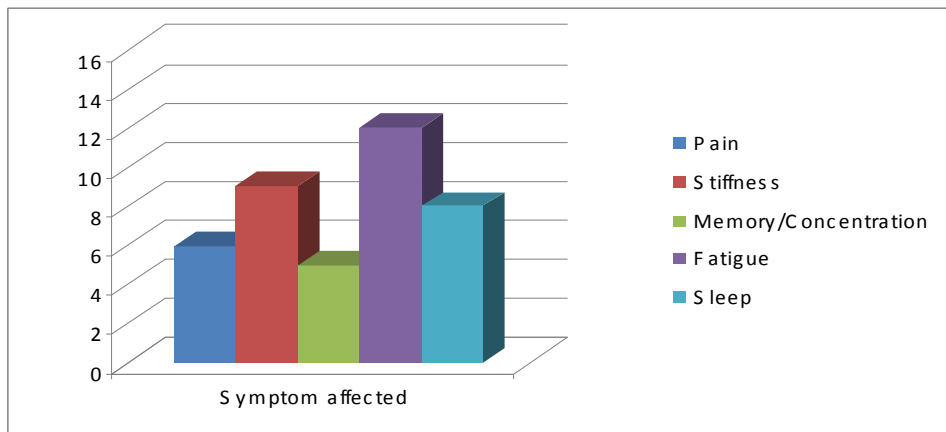


Of the 54% who felt symptoms worsened, 43% said pain worsened, 50% said that stiffness was affected, 71% said that sugar affected their memory & concentration, 78.57% felt that fatigue was worse and 57% said that sugar affected their sleep.

Bread

27 participants answered this question, of which 59% said consuming bread made their FMS symptoms worse and 41% said they felt no change in symptoms. No participants felt that bread improved symptoms.

Graph 2:- Symptoms negatively affected following the consumption of bread. n=16

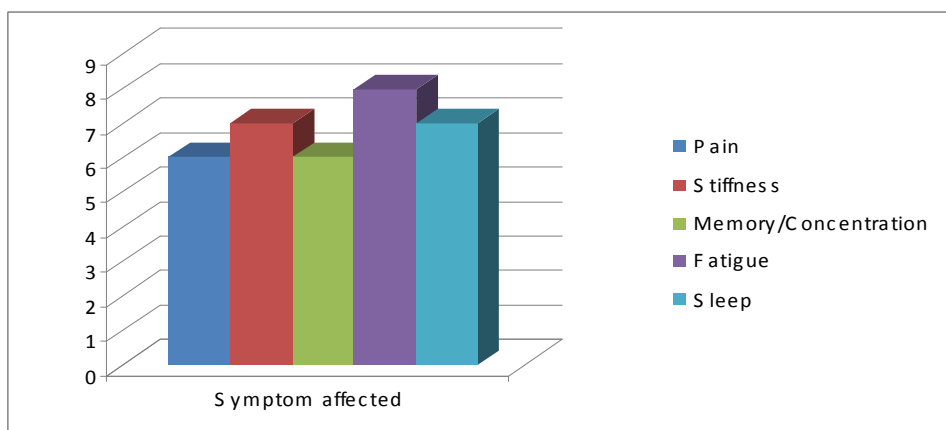


Of the 59% who said that consuming bread made their symptoms worse, 37.5% felt their pain was worse, 56.25% said their stiffness was worse, 31.25% said memory/concentration was worsened, 75% said they felt more fatigued and 50% felt that the consumption of bread affected their sleep negatively.

Cakes and biscuits

25 participants answered this question, of which 36% said consuming cakes and biscuits made their FMS symptoms worse and 60% said they felt no change in symptoms. 1 participant (number 27) felt that consuming cakes and biscuits made her symptoms better.

Graph 3:- Symptoms negatively affected following the consumption of cakes & biscuits. n=9

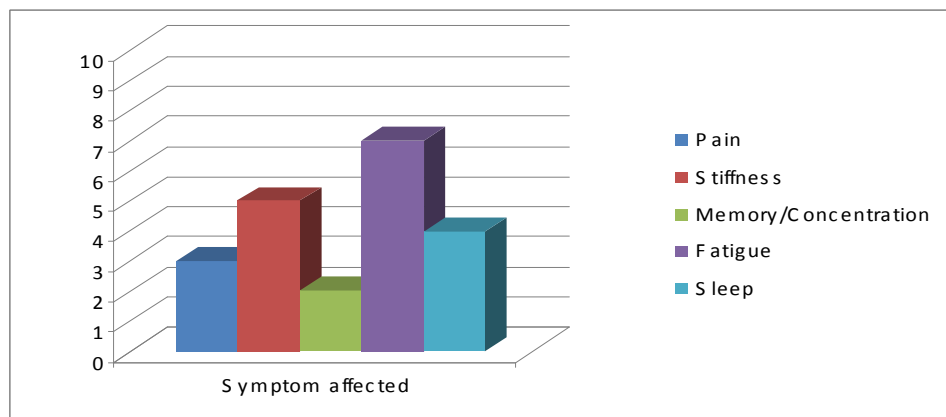


Of the 36% who said that consuming cakes & biscuits made their symptoms worse 66.67% felt their pain was worse, 77.78% said their stiffness was worse, 66.67% said memory and concentration was worsened, 88.89% said they felt more fatigued and 77.78% felt that the consumption of cakes and biscuits affected their sleep negatively.

Pasta

26 participants answered this question, of which 38.46% said consuming pasta made their FMS symptoms worse and 60% said they felt no change in symptoms. 1 participant (number 8) felt that consuming pasta made her symptoms better.

Graph 4:- Symptoms negatively affected following the consumption of pasta. n=10

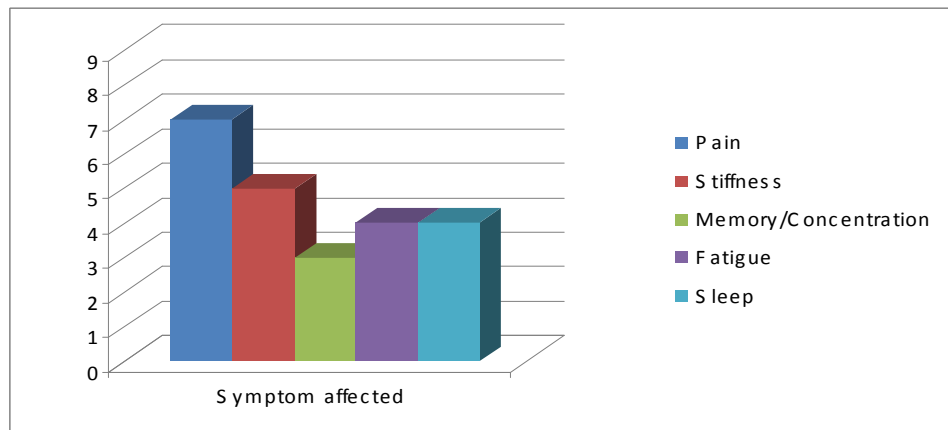


Of the 38.46% who said that consuming pasta made their symptoms worse, 30% felt their pain was worse, 50% said their stiffness was worse, 20% said memory/concentration was worsened, 70% said they felt more fatigued and 40% felt that the consumption of pasta affected their sleep negatively.

Artificial Sweetener

21 participants answered this question, of which 42.86% said consuming artificial sweeteners made their FMS symptoms worse and 57.14% said that they felt no change in symptoms. No participant felt that consuming artificial sweeteners made their symptoms better.

Graph 5:- Symptoms negatively affected following the consumption of artificial sweeteners. n=9

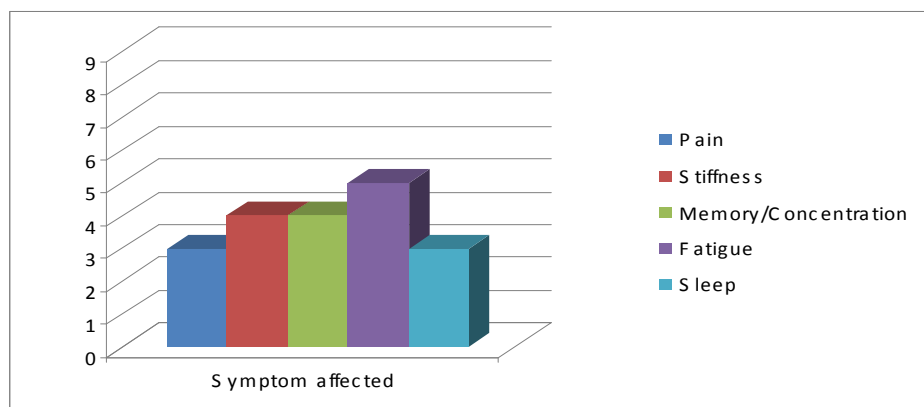


Of the 42.86% who said that consuming artificial sweeteners made their symptoms worse 77.78% felt their pain was worse, 55% said their stiffness was worse, 33% said memory and concentration was worsened, 44% said they felt more fatigued and 44% felt that the consumption of artificial sweeteners affected their sleep negatively.

Carbonated drinks

23 participants answered this question, of which 39.13% said consuming carbonated drinks made their FMS symptoms worse and 60.87% said that they felt no change in symptoms. No participant felt that consuming carbonated drinks made their symptoms better.

Graph 6:- Symptoms negatively affected following the consumption of carbonated drinks. n=9

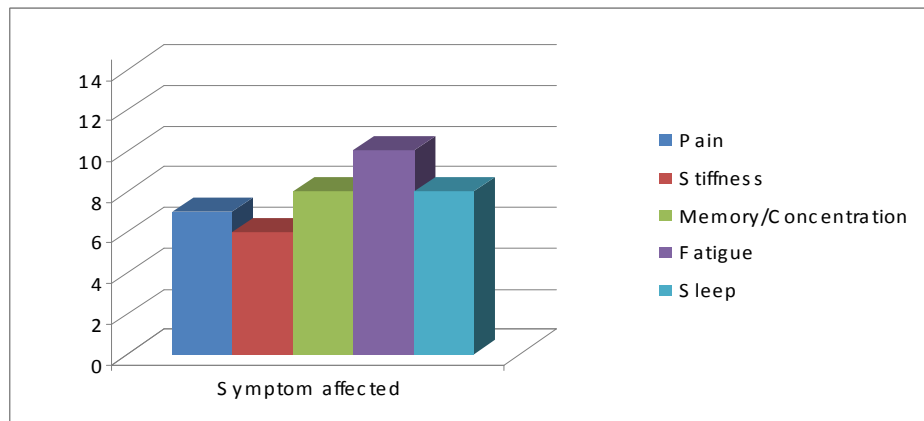


Of the 39.13% who said that consuming carbonated drinks made their symptoms worse 33.33% felt their pain was worse, 44.44% said their stiffness and memory/concentration was worse, 55.56% said they felt more fatigued and 33.33% felt that the consumption of carbonated drinks affected their sleep negatively.

Coffee

26 participants answered this question, of which 57.69% said consuming coffee made their FMS symptoms worse, 11.54% made their fatigue better and 30.77% said that they felt no change in symptoms.

Graph 1:- Symptoms negatively affected following the consumption of coffee. n=15



Of the 57.69% who said that consuming coffee made their symptoms worse 46.67% felt their pain was worse, 40% said their stiffness was worse, 53.33% said memory and concentration worsened, 66.67% said they felt more fatigued and 53.33% felt that the consumption of coffee affected their sleep negatively

Tea

25 participants answered this question, of which 28% said consuming tea made their FMS symptoms worse, 8% made their symptoms better and 64% said that they felt no change in symptoms.

Beer or Cider

20 participants answered this question, of which 45% said consuming beer or cider made their FMS symptoms worse and 55% said that they felt no change in symptoms. No participants said that consuming beer or cider improved their FMS symptoms.

White wine

20 participants answered this questions and the percentage of participants was equally split with 50% feeling that white wine worsened symptoms and 50% feeling no change in symptoms following consumption of white wine.

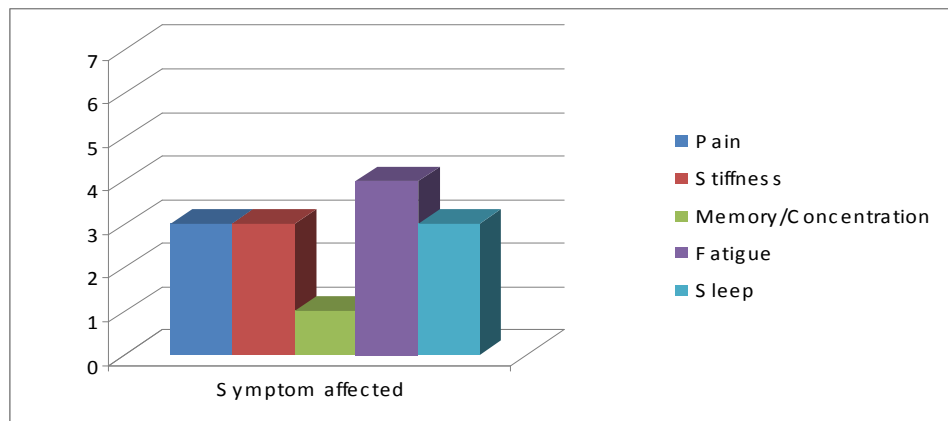
Red Wine

Again 20 participants answered this question and the results were similar to that of white wine, however there was a slight bias to symptoms being worsened with 55% and 45% felt their symptoms remained unchanged following consumption of red wine.

Milk

23 participants answered this question, of which 30.43% felt that following milk consumption their FMS symptoms worsened. 1 participant (number 7) felt her symptoms improved and 65% felt no change in symptoms.

Graph 7:- Symptoms negatively affected following the consumption of milk. n=7

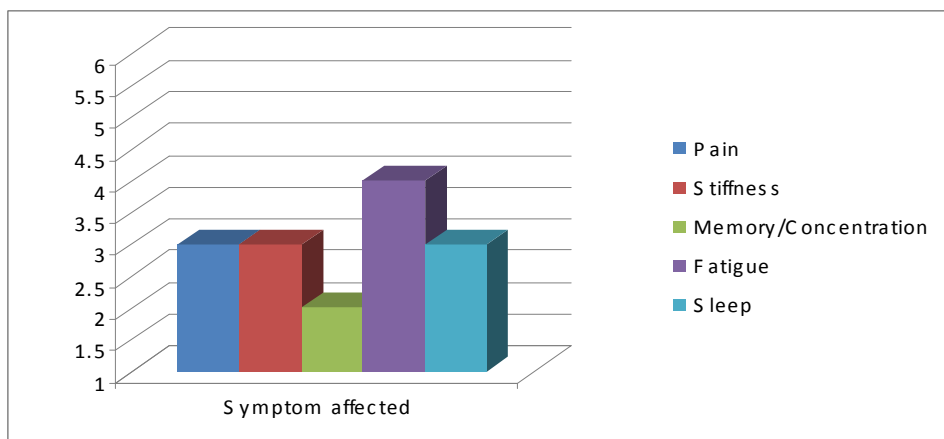


Symptoms that were worsened were fairly equally split with 42% saying that both pain, stiffness and sleep were affected, 57% felt that fatigue was affected negatively and only 14% felt that their memory and/or concentration was affected.

Cheese

24 participants answered this question, of which 25% felt that following the consumption of cheese their symptoms were worsened. 70.83% felt no change in symptoms and again 1 participant (number 7) felt that the consumption of cheese improved her symptoms.

Graph 8:- Symptoms negatively affected following the consumption of cheese. n=6



Like milk, symptoms that worsened following the consumption of cheese were fairly equally split with 50% saying that both pain, stiffness and sleep were affected, 66.67% felt that fatigue was affected negatively, however cheese appeared to affect a greater % of participants' memory and/or concentration with 33.33% ticking this box.

Yoghurt

Again 24 participants answered this question, of which 16.67% felt that following the consumption of yoghurt their symptoms were worsened. This was less than both milk and cheese. 79.16% felt no change in symptoms and again 1 participant (number 7) felt that the consumption of yoghurt improved her symptoms. Like milk and cheese, symptoms that worsened following the consumption of yoghurt were fairly equally split with 50% saying that both pain, stiffness and sleep were affected, however unlike milk and cheese, 50% also felt that fatigue was affected negatively. No participants felt that memory and/or concentration were affected.

Apples & Pears

23 and 21 participants respectively answered these 2 questions. No evidence could be found to show that consumption of these foods affect FMS symptoms and as expected 91% and 95% respectively noticed no change in symptoms on consumption of these foods. Participant 8 felt that the consumption of both apples and pears made her symptoms worse but did not indicate which symptoms worsened and participant 18 felt that her pain and stiffness symptoms improved following the consumption of apples. Participant 18 did not answer the question regarding the consumption of pears.

Oranges

25 participants answered this question of which 24% felt that symptoms worsened following consumption of oranges and 76% felt no change in symptoms. No participants saw an improvement in symptoms following the consumption of oranges. Of those that felt that symptoms worsened, 33.33% felt that stiffness, fatigue and sleep were worsened, 16.67% felt oranges affected their memory and/or concentration and 50% felt that their pain worsened. Several of the 6 participants said that consumption of oranges also affected their IBS symptoms negatively.

Other citrus

24 participants answered this question with 66.67% seeing no change in symptoms and 33.33% feeling symptoms worsened following consumption. The symptoms that were affected were similar to that detailed with oranges with 50% detailing pain, 37.5% detailing stiffness, fatigue and sleep and 12.5% detailing memory and/or concentration. Again several participants said that consumption of other citrus affected their IBS negatively.

Berries

23 participants answered this question of which 82.61% felt no change in symptoms following consumption. 13% felt symptoms worsened and 4% felt symptoms improved.

Bananas

23 participants answered this question of which 78.26% felt no change, 17.39% felt symptoms worsened and 4.34% felt symptoms improved.

Red meat

23 participants answered this question. 78.26% saw no change following consumption, 17.39% felt symptoms worsened and 1 participant felt symptoms improved following consumption.

Chicken

Again 23 participants answered this particular question, of which 69.56% felt no change in symptoms, 6 participants (26%) felt symptoms improved and only 1 participant (number 7) felt that her symptoms worsened but did not detail which symptoms in particular.

Oily fish

24 participants answered this question. 37.5% felt that FMS symptoms improved, no participants felt that the consumption of oily fish made symptoms worse and 62.5% felt no change in symptoms. Of the 9 participants who felt that their symptoms improved only 4 detailed which symptoms – 2 participants felt that pain and stiffness improved, 1 felt that the consumption of oily fish improved memory/concentration and 1 participant felt that fatigue improved.

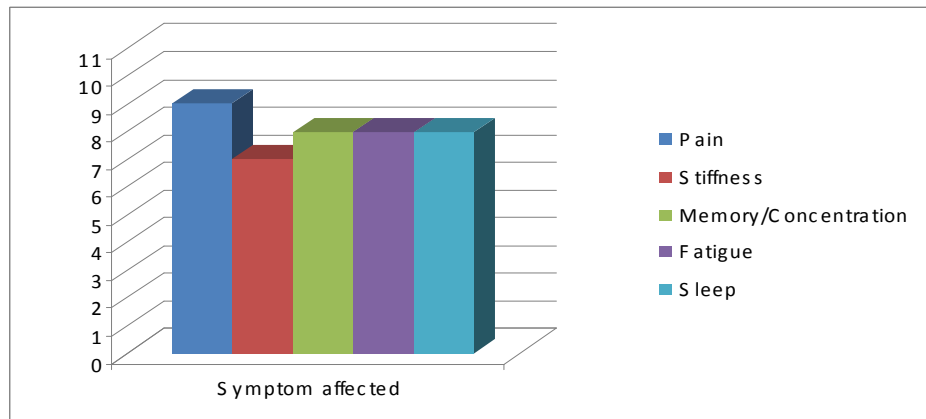
White fish

21 participants answered this question of which none felt that consuming white fish worsened their symptoms. 71.43% felt no change and 28.57% felt that their symptoms improved following consumption of white fish. Only 2 participants detailed which symptoms were affected and both felt that memory/concentration and fatigue improved.

Aspartame

22 participants answered this question and results were evenly split with 50% feeling that symptoms worsened and 50% seeing no change following consumption of foods containing aspartame. No participants felt that the consumption of foods containing aspartame improved their symptoms.

Graph 9:- Symptoms negatively affected following the consumption of Aspartame. n=11

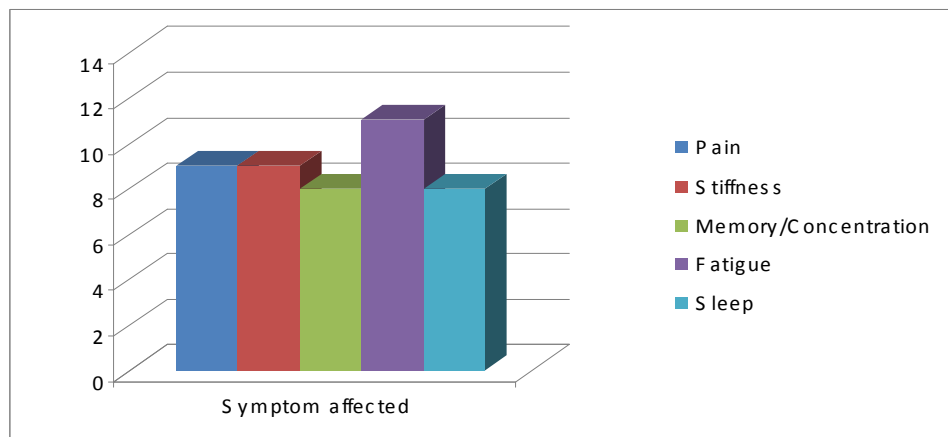


Of those that thought their symptoms worsened, 63.63 felt stiffness worsened, 72.73% felt that memory/concentration, fatigue and sleep were affected negatively and 81.82% felt that their pain worsened following consumption of foods containing aspartame.

Mono Sodium Glutamate (MSG)

25 participants answered this question of which none felt that the consumption of foods containing MSG improved their symptoms. 56% felt that symptoms worsened and 44% felt no change in symptoms.

Graph 10:- Symptoms negatively affected following the consumption of MSG. n=14



Of those that thought their symptoms worsened, 64.28% felt that pain and stiffness worsened, 57.14% felt that memory/concentration and sleep worsened and 78.57% felt that fatigue was affected negatively.

Nuts (unsalted)

23 participants answered this question of which 78% felt no change in symptoms following consumption. 17% felt their pain, stiffness and fatigue improved and 4% felt their symptoms worsened, but did not detail which symptoms.

Nuts (salted)

Again 23 participants answered this question, with 83% feeling no change in symptoms, however unlike the unsalted nuts, the participants who felt a change in symptoms were split equally between worsening and improving, each with 9%.

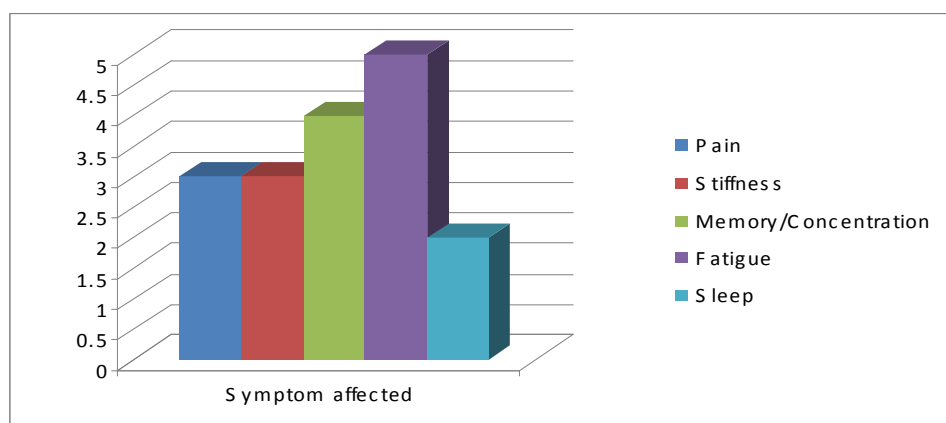
Seeds

23 participants answered this question of which 78% saw no change in symptoms and 22% saw an improvement in symptoms. No participants said that the consumption of seeds worsened their symptoms.

Chocolate

23 participants answered this question of which 61% felt no change. 17% felt that chocolate improved their symptoms although only 2 participants detailed which symptoms and these were different for each participant. 22% felt that chocolate worsened their symptoms as follows;

Graph 11:- Symptoms negatively affected following the consumption of chocolate. n=5

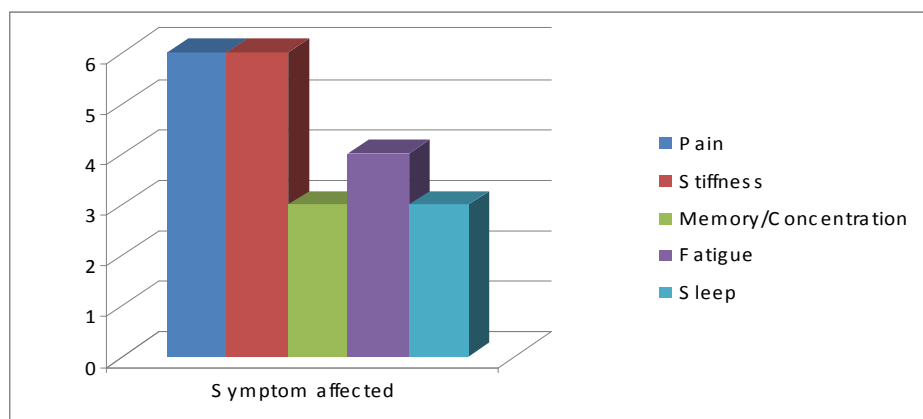


Of the 22% who felt that the consumption of chocolate worsened their symptoms, 100% felt that it affected fatigue negatively, 80% felt that chocolate affected their memory/concentration, 60% felt that it worsened both pain and stiffness and 40% felt that it affected their sleep negatively.

Potatoes

Only 15 participants answered this question with 53% reporting no change in symptoms, 7% reporting an improvement in symptoms and 40% reporting a worsening of symptoms.

Graph 12:- Symptoms negatively affected following the consumption of potatoes. n=6



Of those that felt the consumption of potatoes worsened their symptoms 100% felt that their pain and stiffness was affected, 50% felt that both memory/concentration and sleep were affected negatively and 67% reported that fatigue was affected negatively.

Discussion & Analysis

Limitations of the study

Participants

The criteria for inclusion in the study was designed to limit response rate to a manageable level for one researcher, in the time provided, to analyse the data effectively. However, the criteria for inclusion did limit responses to a level well below what had been expected. Several individuals mentioned via email that the age range precluded them from taking part. Had the survey included a wider geographical area, more responses may have been forthcoming. Gender was also a limiting factor and the researcher knows of 2 males who would have liked to be included but were excluded by their gender.

Response Rate

The number of non-respondents was a possible issue in this study. It was felt that emailing qualifying participants through their support groups was an acceptable way of reaching a large number of possible participants. Although over 300 people were made aware of the survey only 10% completed and returned the survey. This was a disappointing number as it had been hoped that FMS sufferers who are members of support groups may have been pro-active and interested in the results of a study such as this. In addition, the question of bias is raised when there is such a small completion size, however, research has shown the least bias have turned out, in some cases, to come from surveys with less than optimal response rates (American Assoc. for public opinion research '08). Had the study not needed to keep details of participants anonymous, a follow-up email or reminder may have prompted more responses. Multiple follow-ups have also been seen to yield higher response rates than single reminders (Sheehan '06). Given the time, a personal approach to the study with the researcher attending FMS support group meetings and personally giving the questionnaire to FMS sufferers may have yielded a greater response rate. Had the researcher had access to participants details, questionnaires could also have been sent by post and stamped return addressed envelopes been provided.

Style and language of questionnaire.

Not all participants answered all of the questions and this may have been because they did not eat the food listed. A tick box for 'do not eat' may have been useful as would a comment box for each food for participants to detail any additional information including why they did not eat a particular food. Several participants mentioned that they did not eat certain foods in the additional information section, however it would have been helpful to know why. Further research might also investigate how often a food needed to be consumed before a symptom might become affected. Not all participants detailed which symptoms were affected, having ticked the 'worse' box. Looking at the layout of the questionnaire, perhaps the number of tick boxes may have been overwhelming for participants or the symptom that was affected may not have been detailed in the questionnaire. An 'other' box with a comment section, may also have provided further information. 2 participants did not tick any boxes, stating that they had not thought of a link to the food that they ate and their symptoms.

Results

Of those participants who responded to ‘worse’, the foods which brought the highest rates of response were; potatoes 40%, artificial sweetener 43%, beer/cider 45%, white wine 50%, aspartame 50%, sugar 53%, red wine 55%, mono-sodium glutamate 56%, coffee 58%, and bread 59%. This was not a surprising result as these are the foods which many of the websites and books regarding FMS detail as possible triggers for FMS and perhaps this is a confounding factor in itself. However, when looking at which symptoms are affected, the spread of negatively affected symptoms was broad, possibly suggesting that foods affect sufferers’ individual symptoms differently. However, as detailed in descending order in Chart.1, symptoms that were most affected upon consumption of these foods were fatigue, pain, stiffness, sleep and memory/concentration.

Chart 1:- Symptoms affected by foods detailed as worsening symptoms

Food	pain	stiffness	memory/concentration	fatigue	sleep
Potatoes	6	6	3	4	3
Art. Sweetener	7	5	3	4	4
Beer/Cider	4	4	3	5	4
White Wine	5	4	3	4	5
Aspartame	9	7	8	8	8
Sugar	6	7	10	11	8
Red Wine	6	5	5	5	5
MSG	9	9	8	11	8
Coffee	7	6	8	10	8
Bread	6	9	5	12	8
Totals	65	62	56	74	61

Although bread featured as the most commonly ticked food for negatively affecting symptoms for 59% of participants who answered this question, cakes/biscuits and pasta did not have as great a response. Cakes and biscuits had 36% of respondent ticking ‘worse’ and pasta had 38%. It was assumed that these two foods would have affected sufferers’ symptoms as least as negatively as bread, due to their wheat and/or gluten content. Cakes and biscuits also usually contain reasonably high levels of sugar; another food which features highly as negatively affecting symptoms.

Noticeably fatigue was the symptom that was most negatively affected upon consumption of all three foods. A further study into food and FMS symptoms may look to investigate this area further.

Coffee was the food which brought the second highest result for negatively affecting symptoms with almost 58% of participant that answered this question stating that coffee consumption worsened their symptoms. All symptoms were affected, however the highest scoring symptom was fatigue with 67% of participants ticking this box. Again this finding was not surprising as although acute caffeine consumption can bring short term stimulation, regular intake may actually lead to fatigue (Murray & Bongiorno '06). Tea however brought a response of 28% of participants stating that consumption negatively affected symptoms. This lower result may be due to the lower level of caffeine in tea than in coffee (Bunker and McWilliams '79).

It is disappointing that so few participants answered the potato question as potato is part of the nightshade family and these foods are thought to be triggers to FMS symptoms due to their alkaloid content (Stanchich '03). However, of those that did answer the question, 100% felt that consuming potatoes negatively affected pain and stiffness. This was the only food where 100% of participants said that a symptom was affected. A further study might investigate the Nightshade family further, of which the most common vegetables are; potatoes, tomatoes, peppers, aubergines and courgettes.

FMS patients are often advised to avoid dairy and dairy products and the results of these questions indicate that dairy may play a role in worsening of symptoms with 30% of participants detailing milk as a perceived trigger. The figures for cheese and yoghurt were lower than milk with 25% for cheese and only 17% for yoghurt and the spread of symptoms being affected was fairly even for pain, stiffness, fatigue and sleep, however fewer participants felt that their memory/concentration was affected by the consumption of dairy products.

Carbonated drinks had a high negative response with 39% of respondents detailing a worsening of symptoms. It is unknown why this result was reasonably high. It may have been more useful to split this question into diet carbonated drinks and standard carbonated drinks to see if perhaps the diet drinks which contain artificial sweeteners such as aspartame had a greater effect on symptoms than standard drinks which contain sugar. However the sugar content of standard drinks may equally affect symptoms and so further research is required to draw any relevant conclusions.

The foods which brought the least response to 'worse' were; apples, pears, chicken, oily fish, white fish, nuts (unsalted), nuts (salted) and seeds with less than 10% of participants detailing that these affected symptoms negatively. This was not a surprising result as these foods are not known to be triggers to FMS and essential fatty acids from the omega-3 oils found in fish are thought to be beneficial to inflammatory and auto-immune conditions (Simopoulos '02). 37.5% of participants who answered the oily fish question stated that consuming oily fish made their pain, stiffness, memory/concentration and fatigue better. 29% of participants stated that the consumption of white fish improved their memory/concentration and fatigue but not pain or stiffness. Nuts, both salted and unsalted, and seeds also contain essential fatty acids. Unsalted nuts brought a greater response to improving symptoms than salted nuts with 17% and 9% respectively of participants who answered this question seeing improvement. Salt is also recommended as a food to be avoided by FMS patients and perhaps the negative effect of the salt outweighs the positive effect of the essential fatty acids which might explain the difference in response. 22% of participants answering the seeds question stated that they felt improvement to symptoms however only one participant detailed which symptoms were affected, these being pain and stiffness.

Oranges and other citrus fruits brought a negative response to symptoms of 24% and 33% respectively, however several participants also detailed that these foods worsen their IBS symptoms, so contributing to pain and it is difficult to know if the consumption of these foods bring about a worsening of FMS symptoms themselves or a worsening of symptoms as a result of a worsening of the participants' IBS. This certainly would require further clarification in a larger study.

Berries may also fit into this category as 13% detailed a worsening of symptoms, but again in some instances this was related to IBS.

Bananas were initially included in the questionnaire as a food that is not known to trigger FMS symptoms, however this elicited a negative response by 17% of participants who answered this question. No clinical research could be found which details bananas being a possible trigger for FMS or a common allergen and so this result is difficult to explain and would require further investigation.

Red meat is known to be an inflammatory food and to contain saturated fats (Clayton '04) and FMS patients are often advised to reduce their intake and obtain animal proteins from fish and white meat such as chicken instead. 17% of participants felt that the consumption of red meat worsened pain, stiffness and fatigue and to a lesser extent memory/concentration and sleep. Only 1 participant (4%) felt that the consumption of chicken negatively affected her symptoms and 26% felt that symptoms improved following the consumption of chicken. 14% felt no change in symptoms.

The majority of participants (61%) felt no change in symptoms when consuming chocolate. 21% felt a worsening of symptoms and 17% felt that symptoms improved. 100% of those who said symptoms worsened said that fatigue was negatively affected and 80% said that memory/concentration was negatively affected. It would have been useful to have separated chocolate into two separate questions for milk chocolate and dark chocolate to observe if this changed the results, as one participant detailed that dark chocolate was beneficial whereas milk chocolate was not. Again further investigation in a follow-up study may give more defined results.

Conclusions

A large proportion of the FMS patients surveyed perceived that many of the foods contained in the survey affected their FMS symptoms either negatively or positively. Most notably, in ascending order; potatoes, artificial sweetener, beer/cider, white wine, aspartame, sugar, red wine, mono-sodium glutamate, coffee, and bread all negatively affected the symptoms of more than 40% of participants, who completed these questions. Chicken, oily fish, white fish, nuts (unsalted), seeds and chocolate all positively affected the symptoms of more than 10% of participants, who answered these questions.

This finding conflicts with the opinions of many conventional healthcare providers who maintain that there is no link between the symptoms of Fibromyalgia and foods consumed by the sufferer. This small pilot study has highlighted some interesting points which would need further investigation in a larger study to confirm participants' perception that the consumption of certain foods or food groups does in fact contribute to the worsening or amelioration of their FMS symptoms.

©Jacqui Mayes 2009

Word count: 5,971 (not including Abstract)

Abstract word count: 263

References

- Aaron, L.A. Burke, M.M. & Buchwald, D. (2000), "Overlapping conditions among patients with Chronic Fatigue Syndrome, Fibromyalgia, and Temporomandibular Disorder", *Archives of Internal Medicine*, vol. 160, no. 2, pp. 221-227.
- American Association for Public Opinion Research (2006), *Response rates - An overview*. Available from: <http://www.aapor.org/responseratesanoverview> [Accessed: October 27, 2008].
- Bennett, R. (2004), "Fibromyalgia: present to future. ", *Current pain and headache reports*, vol. 8, no. 5, pp. 379-384.
- Berne, K. (2001), "*Chronic Fatigue Syndrome, Fibromyalgia, and Other Invisible Illnesses: The Comprehensive Guide*", Hunter House, Alameda,
- Bunker, M.L. & McWilliams, M. (1979), "Caffeine content of common beverages", *Journal of The American Dietetic Association*, vol. 74, no. 1, pp. 28-32.
- Chakrabarty, S. & Zoorob, R. (2007), "Fibromyalgia", *American family physician*, vol. July 15.
- Clayton, P. (2004), *Health Defence*, 2nd ed, Accelerated Learning Systems, Aylesbury.
- Donaldson, M.S. Speight, N. & Loomis, S. (2001), "Fibromyalgia syndrome improved using a mostly raw vegetarian diet: An observational study ", *BMC Complementary and Alternative Medicine* , vol. 1, no. 7,
- Elrod, J.M. (2002), "Diagnosing fibromyalgia". In *Reversing fibromyalgia*, Woodland Publishing, Pleasant Grove, p.26
- Fibromyalgia Association Uk (2008), *Guidance on the management of Fibromyalgia for the multidisciplinary team*. Available from: <http://www.fibromyalgia-associationuk.org/dmdocuments/Medical%20Pack.pdf> [Accessed: October 20, 2008].
- Fibromyalgia-symptoms.org (2008), *Fibromyalgia causes: food allergies*. Available from: http://www.fibromyalgia-symptoms.org/food_allergies.html [Accessed: October 20, 2008].
- Kaartinen, K. Lammi, K. & Hypen, M. (2000), "Vegan diet alleviates fibromyalgia symptoms. ", *Scandinavian Journal of Rheumatology*, vol. 29, no. 5, pp. 308-313.
- Logan, A.C. (2003), "Dietary Modifications and Fibromyalgia ", *Complementary Health Practice Review*, vol. 8, no. 3, pp. 234-245.

References cont.

Lowe, J.C. & Honeyman-low, G. (2006), "Fibromyalgia Syndrome". In Pizzorno, J.E. & Murray, M.T. (eds), *Textbook of Natural Medicine*, 3rd ed, Churchill Livingstone Elsevier, St Louis, pp.1671-1682

Murray, M.T. & Bongiorno, P.B. (2006), "Chronic Fatigue Syndrome". In Pizzorno, J.E. & Murray, M.T. (eds), *Textbook of Natural Medicine*, 3rd ed, Churchill Livingstone Elsevier, St.Louis, p.1587

Netdoctor (2004), *Asthma - extent of Asthma in the UK*. Available from:

http://www2.netdoctor.co.uk/diseases/facts/asthma_extentinuk.htm [Accessed: October 22, 2008].

Neumann L, Buskila D. Epidemiology of fibromyalgia. *Current Pain and Headache Reports* 2003; Vol. 7, pp.362-8.

Poiro-boisset, M. Esdaile, J.M. & Fitzcharles, M.A. (1996), "Alternative medicine use in fibromyalgia syndrome.", *Arthritis Care and Research*, vol. 9, no. 1, pp. 1-4.

Sheehan, K.B. (2006), "E-mail Survey Response Rates: A Review ", *E-mail Survey Response Rates: A Review* , vol. 6, no. 2.

Simopoulos, A.P. (2002), "Omega-3 Fatty Acids in Inflammation and Autoimmune Diseases", *Journal of the American College of Nutrition*, vol. 21, no. 6, pp. 495-505.

Spiller, R. Aziz, Q. & Creed, F. (2007), "Guidelines on the irritable bowel syndrome: mechanisms and practical management. ", *Gut*, vol. 56, no. 12, pp. 1770-1798.

Stanchich, L. (2003), All about nightshades: explore the hidden hazards of your favourite food with macrobiotic nutritionist Lino Stanchich . *New Life Journal*. Available from:
http://findarticles.com/p/articles/mi_m0KWZ/is_5_4/ai_111734421 [Accessed: October 28, 2008].

Sult, T. (2006), "Clinical approaches to gastrointestinal imbalance". In Jones, D.S. & Quinn, S. (eds), *Textbook of Functional Medicine*, 2nd ed, The Institute of Functional Medicine, Gig Harbour, p.446

Sim, J. & Adams, N. (2002), "Systematic review of randomized controlled trials of nonpharmacological interventions for fibromyalgia", *The Clinical Journal of Pain*, vol. 18, no. 5, pp. 324-336.

Uk Fibromyalgia (2008), *UK Fibromyalgia - What is Fibromyalgia?*. Available from:

<http://www.ukfibromyalgia.com/what-is-fm.html> [Accessed: October 20, 2008].

University of Maryland Medical Center (2008), *Fibromyalgia*. Available from: University of Maryland, Medical Centre Web site:

http://www.umm.edu/patiented/articles/what_causes_fibromyalgia_000076_2.htm [Accessed: October 20, 2008].

Wahner-roedler, D.L. Elkin, P.L. & Vincent, A. (2005), "Use of complementary and alternative medical therapies by patients referred to a fibromyalgia treatment program at a tertiary care center.", *Mayo Clinic proceedings*, vol. 80, no. 1, pp. 55-60.

References cont.

Wolfe, F. Smythe, H.A. & Yunus, M.B. (1990), "The american college of rheumatology 1990 criteria for the classification of fibromyalgia ", *Arthritis and Rheumatism*, vol. 33, no. 2, pp. 160 - 172.

Appendix 1:- Covering letter for questionnaire

Dear Fibromyalgia Support Group Member,

I am currently in my third and final year of a BSc in Nutritional Therapy with Middlesex University. As a fibromyalgia sufferer myself who has an interest and love of food and its effect on health, I have decided to do a survey of fibromyalgia sufferers to see if there is a link between the food we consume and its effect on fibromyalgia symptoms as my research dissertation and I am delighted that you may be willing to help.

I am looking for participants who are female, aged between 25 and 60 years, who have been diagnosed with fibromyalgia and who have suffered with symptoms for at least 1 year. In order to make numbers manageable, I have been advised to limit participation to women who live in the South East of England.

Participants will remain anonymous and the college has set up an email address for replies so that I have no direct access to participants email addresses. It will be assumed that by completing the questionnaire you give your consent to take part in this study and for the information given to be used for this research project. Your part in this study will be confidential. None of the information used will identify you by name. There are no risks involved in taking part and the results of this study may provide some useful information regarding the role of food and the management of fibromyalgia.

Once my dissertation is completed I intend, subject to Middlesex's approval, to make it available to all those who took part through their relevant support group.

I attach the survey and would be most grateful if you would spend a few minutes completing the questionnaire and then return it to fibrosurvey@cnelm.co.uk.

Again, thank you so much for your help and please feel free to email the above address if you have any queries.

With all best wishes.

Yours sincerely

Jacqui Mayes