

Use of Complementary and Integrative Therapies by Fibromyalgia Patients: A 14-Year Follow-up Study

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Abstract

Objective: To reevaluate the frequency and pattern of complementary and integrative medicine (CIM) use in patients with fibromyalgia (FM).

Patients and Methods: Consecutive patients with FM who were referred to the Mayo Clinic fibromyalgia treatment program from January 5 through July 27, 2017, were invited to complete a survey about their use of CIM therapies in the preceding 6 months. The survey asked about 3 primary CIM domains: treatments and techniques, vitamins and minerals, and herbs and other dietary supplements. For direct comparative purposes, we reused the survey instrument from our prior analogous study of CIM use, performed in 2003.

Results: Of the 310 patients who completed the survey, 304 (98.1%) reported using some form of CIM, similar to the percentage reported in our 2003 study (98%). The most frequently used CIM therapies in the current cohort were spiritual healing (54.0% [163 of 302]), massage therapy (50.0% [152 of 304]), chiropractic treatments (39.3% [118 of 300]), aromatherapy (39.0% [117 of 300]), exercise for a specific medical problem (38.6% [117 of 303]), melatonin (37.9% [77 of 203]), magnesium (36.3% [107 of 295]), green tea (36.1% [73 of 202]), and fish oil (34.5% [68 of 197]). We noted numerous substantial differences from the 2003 data in terms of the pattern of CIM use.

Conclusion: The use of CIM therapies among patients with FM continues to be extremely common for adult patients of all ages. Given the continued high prevalence of CIM use, health care professionals must have awareness and knowledge of these various modalities and their potential incorporation into a multifaceted FM treatment regimen.

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Fibromyalgia (FM) is a syndrome characterized by chronic widespread musculoskeletal pain that is often associated with unrefreshing sleep, stiffness, fatigue, cognitive difficulty, and psychological distress.¹ The cause of FM is unknown. A recent study has suggested that FM is a disorder of pain regulation or a form of central sensitization.² Fibromyalgia is the second most common disorder seen in rheumatologic practices,^{3,4} with an estimated prevalence of 2% to 8%. In the United States, more than 11.28 cases per 1000 women and 6.88 cases per 1000 men are diagnosed annually.^{5–8} Currently, FM is diagnosed on the basis of a composite score of a patient's presenting symptoms; the previous diagnostic criterion of a specific number of tender points is no

longer required.^{9–11} Furthermore, with its diverse range of symptoms, FM markedly affects overall quality of life.^{12–14}

At present, FM has no known cure; treatment options aim to improve overall functioning and reduce symptom burden.^{15,16} Fibromyalgia is widely known to respond better to a multimodal treatment approach that includes medication and nonmedication treatment options.¹ However, despite numerous recent advances in treatment strategies, many patients still have long-term pain and therefore continue to explore other treatments, including complementary and integrative medicine (CIM) options.

According to the US Department of Health and Human Services, in collaboration with the Centers for Disease Control and

Prevention and the National Center for Health Statistics, use of CIM therapies remains high, and according to their 2018 report, it is increasing in the United States in general^{17,18} and among persons with musculoskeletal pain disorders. Several evidence-based research studies and reviews have described the use and promising results of various CIM treatments as ancillary strategies for patients with FM,^{19–24} and in 2003, our group surveyed patients with FM and reported a high prevalence (98%) of CIM use.²⁵ However, to our knowledge, no studies have compared the trends of CIM use in this patient population. To address this gap, we conducted a comparative study among a cohort of patients with FM seen at an academic, referral-based medical center. The aim of this study was to reevaluate the frequency and usage pattern of CIM therapies among patients with FM and to compare the current results with the trends observed in our 2003 study.²⁵

PATIENTS AND METHODS

This study was approved by the Mayo Clinic Institutional Review Board.

Diagnosis and FM Treatment Program

Patients underwent an initial evaluation by a registered nurse, specifically trained in FM, in collaboration with a physician. A diagnosis of FM was established by using the American College of Rheumatology 1990 and 2010 criteria.^{9,11} If FM was confirmed, the patient was then enrolled in the Mayo Clinic FM treatment program (FTP) (Rochester, Minnesota). Our 2003 study used the 1990 diagnostic criteria for FM. Since the publication of the 2010 diagnostic criteria, the Mayo FTP has used both sets of criteria in clinical practice. The American College of Rheumatology has since published a 2016 revision,¹⁰ but the FTP is currently still in the process of integrating these criteria into clinical practice; thus, cases diagnosed by the most recent criteria were not included in the current study.

The Mayo Clinic FTP is a 1.5-day multidisciplinary outpatient treatment program, staffed by physicians from the Division of General Internal Medicine. Access to this program is limited to patients who are referred by other Mayo Clinic physicians or their local primary care physicians. The FTP consists of

group and individual sessions that are taught by a core group of registered nurses, general internists, physical therapists, occupational therapists, psychiatrists, psychologists, and ancillary staff. The primary aims of the FTP are to educate patients, improve physical and mental health functioning, provide evidence-based treatment options, and create a lasting treatment regimen.

Patients and Survey Instrument

Consecutive patients referred to the Mayo Clinic FTP from January 5 through July 27, 2017, were individually invited to complete a survey about their use of CIM therapies in general during the preceding 6 months. The survey asked about 3 primary domains: treatments and techniques (21 questions), vitamins and minerals (12 questions), and herbs and other dietary supplements (52 questions). For direct comparative purposes, we reused the survey instrument from our prior study (February 1 through July 31, 2003).²⁵ Patients were instructed to respond “yes,” “no,” or “I don’t know what [this option] is” for each potential CIM option, in accordance with their usage during the previous 6 months. The survey included space where patients could write in additional CIM therapies. In accordance with the National Center for Complementary and Integrative Health, we excluded dietary supplements that have been incorporated into conventional medicine: multiple vitamins with and without minerals, vitamin D, folic acid (folate), calcium, iron, and potassium.

Statistical Analyses

Survey responses are summarized with frequencies and percentages for categorical variables and means and standard deviations for continuous variables. We used χ^2 tests or Fisher exact tests, as appropriate, to compare overall CIM usage between 2003 and 2017 and also to compare usage in narrower and broader age categories by study year. Because of the large number of statistical tests, the threshold for statistical significance was set at $P=.0004$ with the Bonferroni method (0.05/130 tests). All statistical analyses were performed using SAS statistical software, version 9.4 (SAS Institute).

RESULTS

Demographic Characteristics

Of 407 patients invited to participate in the study, 310 (76.2%) completed the survey (Figure 1). Consistent with the prevalence of FM,^{4,25} most survey respondents were women (268 of 308 [87.0%]; sex was not reported for 2 respondents). The mean \pm SD patient age was 44.2 ± 13.5 years. In comparison, in our 2003 study, of the 304 patients invited to participate, 289 (95.1%) completed the survey. For the earlier survey, the majority of respondents were also women (263 [91.0%]), and the mean patient age was 48.8 years (range, 18-90 years).

Total CIM Use

Nearly all patients (304 of 310 [98.1%]; 265 of 268 women [98.9%] and 38 of 40 men [95.0%]) reported some kind of CIM use, similar to 98% who reported using CIM in 2003. Among the 310 patients in the 2017 survey, the 9 most common CIM therapies were spiritual healing (54.0% [163 of 302]), massage therapy (50.0% [152 of 304]), chiropractic treatments (39.3% [118 of 300]), aromatherapy (39.0% [117 of 300]), exercise for a specific medical problem (38.6% [117 of 303]), melatonin (37.9% [77 of 203]), magnesium (36.3% [107 of 295]), green tea (36.1% [73 of

202]), and fish oil (34.5% [68 of 197]). Among the 289 participants in the 2003 survey, the most common CIM therapies were exercise for a specific medical problem (48.1% [139 of 289]), spiritual healing (45.0% [130 of 289]), massage therapy (43.9% [127 of 289]), chiropractic treatments (37.0% [107 of 289]), vitamin C (34.9% [101 of 289]), vitamin E (31.1% [90 of 289]), magnesium (29.1% [84 of 289]), vitamin B complex (24.9% [72 of 289]), green tea (23.9% [69 of 289]), and weight loss programs (20.1% [58 of 289]).²⁵ In many countries, spiritual healing is not considered part of CIM; thus, when spiritual healing was excluded from the analysis, 301 patients (97.1% total [301 of 310]; 97.8% of women [262 of 268], 95.0% of men [38 of 40]) reported some type of CIM use. Supplemental Tables 1 through 3 (available online at <http://www.mcpiqjournal.org>) show the specific modalities reported by at least 5% of respondents to the 2017 survey.

Treatments and Techniques

In the current cohort, 94.2% of patients with FM (292 of 310) reported using some form of CIM-based treatment or technique. The overall proportion of patients using at least one CIM treatment or technique increased significantly from 2003 to 2017 (86.9% [251 of 289 patients] to 94.2% [292 of 310]; $P < .0001$); treatments and techniques that were increasingly used were aromatherapy (14.9% [43 of 289] to 39.0% [117 of 300]; $P < .0001$), homeopathic medicine (10.0% [29 of 289] to 24.2% [72 of 298]; $P < .0001$), and art therapy (4.8% [14 of 289] to 17.1% [51 of 298]; $P < .0001$). The use of various CIM-based treatments or techniques also differed significantly by age (Table).

Treatments and techniques used by at least 10% of respondents from the 2017 survey are reported in the Table. Other less frequently reported treatments and techniques were chelation therapy, dance therapy, and hypnosis.

Vitamins and Minerals

Approximately three-quarters of patients in the current cohort (73.5% [228 of 310]) reported using at least one vitamin or mineral, less than the 83% (240 of 289) who reported consuming them in the previous study ($P < .0001$). The use of vitamin E decreased

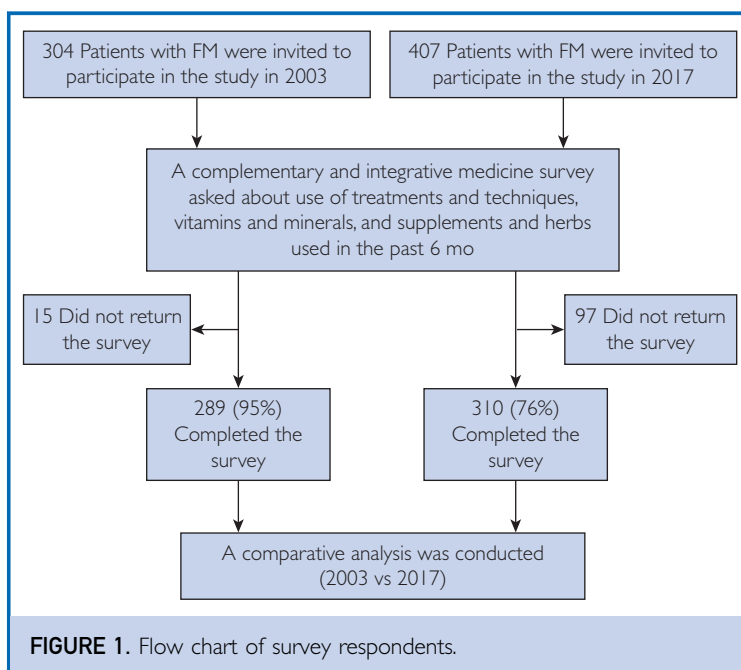


TABLE. CIM Therapies Used by Patients Referred to a Fibromyalgia Treatment Program^{a,b,c}

CIM therapy ^d	All respondents			2017 Data, stratified by age (y)						P value
	2003 Survey (N=289)	2017 Survey (N=310)	P value	18-24 (n=25)	25-34 (n=57)	35-44 (n=70)	45-54 (n=80)	55-64 (n=57)	≥65 (n=19)	
Treatments and techniques										
Exercise for a specific medical problem	48.1	38.6	.02	36.0	37.5	38.6	35.9	40.7	50.0	<.0001
Spiritual healing	45.0	54.0	.03	44.0	49.1	47.1	62.8	60.4	52.6	<.0001
Massage therapy	43.9	50.0	.14	56.0	50.9	54.3	48.1	39.3	68.4	<.0001
Chiropractic treatments	37.0	39.3	.56	28.0	49.1	42.6	48.1	25.9	21.1	<.0001
Weight loss programs	20.1	17.1	.36	16.0	14.5	10.1	23.0	20.4	21.1	<.0001
Relaxation therapy	17.0	27.9	.002	28.0	34.5	21.4	31.2	21.8	35.3	<.0001
Aromatherapy	14.9	39.0	<.0001	40.0	47.3	37.7	42.1	29.6	31.6	<.0001
Music therapy	12.1	18.7	.03	16.7	21.8	10.1	27.3	14.8	15.8	<.0001
Acupuncture	11.1	19.8	.003	24.0	21.1	14.7	22.4	16.1	31.6	<.0001
Self-help (support groups)	11.1	16.7	.049	25.0	14.5	12.9	23.7	7.4	21.1	<.0001
Homeopathic medicine	10.0	24.2	<.0001	8.0	40.0	27.1	21.6	16.7	22.2	<.0001
Acupressure	10.0	14.1	.13	12.0	13.0	17.4	17.3	5.6	21.1	<.0001
Reflexology	9.0	11.8	.27	0	20.4	10.3	17.3	5.6	5.3	<.0001
Energy healing	8.0	13.3	.04	0	16.4	18.6	13.3	10.9	10.5	<.0001
Art therapy	4.8	17.1	<.0001	24.0	22.6	13.0	17.1	14.8	15.8	<.0001
At least 1 treatment or technique	86.9	94.2	<.0001	100.0	98.2	94.3	95.0	89.5	89.5	.0001
Vitamins and minerals										
Vitamin C	34.9	30.7	.28	24.0	27.8	26.5	27.0	40.4	50.0	<.0001
Vitamin E	31.1	13.4	<.0001	12.0	11.5	10.3	11.0	17.0	35.3	<.0001
Magnesium	29.1	36.3	.06	36.0	31.5	34.8	34.7	37.7	64.7	<.0001
Vitamin B complex	24.9	39.3	.0002	32.0	37.7	33.8	44.2	40.4	50.0	<.0001
Zinc	13.2	17.1	.19	16.0	9.3	14.7	20.3	18.9	35.3	<.0001
High-dose combination vitamin	12.1	14.6	.37	12.0	20.0	7.6	17.8	14.0	12.5	<.0001
Vitamin A	8.0	10.1	.38	16.0	5.7	10.3	8.2	11.8	18.8	.0001
At least 1 vitamin or mineral	83.0	73.5	<.0001	60.0	78.9	68.6	72.5	77.2	89.5	<.0001
Herb or dietary supplement										
Green tea	23.9	36.1	.003	11.1	36.8	30.4	41.2	45.7	41.7	<.0001
Glucosamine	18.0	16.4	.65	11.1	10.5	13.0	20.0	20.0	33.3	<.0001
Flaxseed	13.2	28.5	<.0001	11.1	26.3	26.1	29.2	44.4	16.7	<.0001
Acidophilus	13.2	25.6	.0005	17.6	13.5	28.3	26.0	40.0	25.0	<.0001
Coenzyme Q10	12.1	15.2	.28	4.0	9.1	13.2	12.3	28.0	35.3	<.0001
Fish oil	11.1	34.5	<.0001	29.4	37.8	34.8	25.0	48.6	33.3	<.0001
Garlic	9.0	23.7	<.0001	16.7	16.2	13.0	30.6	32.4	41.7	<.0001
L-Lysine	5.9	14.7	.001	5.6	16.2	13.0	16.7	20.6	8.3	.0003
Ginger	4.8	30.3	<.0001	27.8	32.4	23.9	27.1	34.3	50.0	<.0001
Melatonin	4.8	37.9	<.0001	61.1	47.4	30.4	28.8	34.3	58.3	<.0001
Milk thistle	4.8	6.0	.57	0	8.1	6.5	8.0	2.9	8.3	.002
Cayenne ^e	<5	11.2	...	11.1	5.4	13.0	10.4	14.7	16.7	.0005
At least 1 herb or dietary supplement	50.9	57.1	<.0001	60.0	59.6	52.9	52.5	61.4	68.4	<.0001

^aCIM = complementary and integrative medicine.

^bData are presented as No. (percentage) of patients.

^cNs reflect the number of 2017 respondents within each age category. The denominator varies for each percentage due to missing data.

^dSpecific modalities reported by at least 10% of respondents to the 2017 survey are shown. Supplemental Tables 1 through 3 (available online at <http://www.mcpiqjournal.org>) show all modalities reported by at least 5% of respondents to the 2017 survey.

^eNot reported in 2003.

significantly (31.1% [90 of 289] to 13.4% [38 of 284]; $P < .0001$), whereas vitamin B complex use increased (24.9% [72 of 289] to 39.3% [116 of 295]; $P = .0002$). The use of various vitamins and minerals differed significantly by age (all $P = .0001$ or less) (Table). Vitamins and minerals used by at least 5% of respondents from the 2017 survey are reported in the Table. An infrequently reported mineral was silver.

Herbs and Other Dietary Supplements

A greater proportion of the 310 patients surveyed in 2017 used at least one herb or dietary supplement compared with the 289 in the previous study (57.1% [177 of 310] vs 50.9% [147 of 289]; $P < .0001$). Over time (2003 to 2017), we noted significant increases in the use of flaxseed (13.2% [38 of 289] to 28.5% [57 of 200]; $P < .0001$), fish oil (11.1% [32 of 289] to 34.5% [68 of 197]; $P < .0001$), garlic (9.0% [26 of 289] to 23.7% [47 of 198]; $P < .0001$), ginger (4.8% [14 of 289] to 30.3% [60 of 198]; $P < .0001$), and melatonin

(4.8% [14 of 289] to 37.9% [77 of 203]; $P < .0001$). The use of specific herbs and dietary supplements increased from less than 5% in 2003 to the following levels in 2017: cayenne (11.2% [22 of 197]), senna (7.1% [14 of 197]), and methylsulfonylmethane (5.6% [11 of 197]). Herbs and other dietary supplements used by at least 5% of respondents from the 2017 survey are reported in Supplemental Table 3, available online at <http://www.mcpiqjournal.org>. Other less frequently reported herbs and dietary supplements included the use of lutein, creatine, kava, ashwagandha, cat's claw, goldenseal, and stinging nettle.

Trends of CIM Use by Age Group in 2003 vs 2017

In general, CIM use increased with time for patients of all ages. We stratified patients by age, following the groupings used in the 2003 study to facilitate comparisons. Figure 2 shows the CIM modalities with the greatest increase in use from 2003 to 2017.

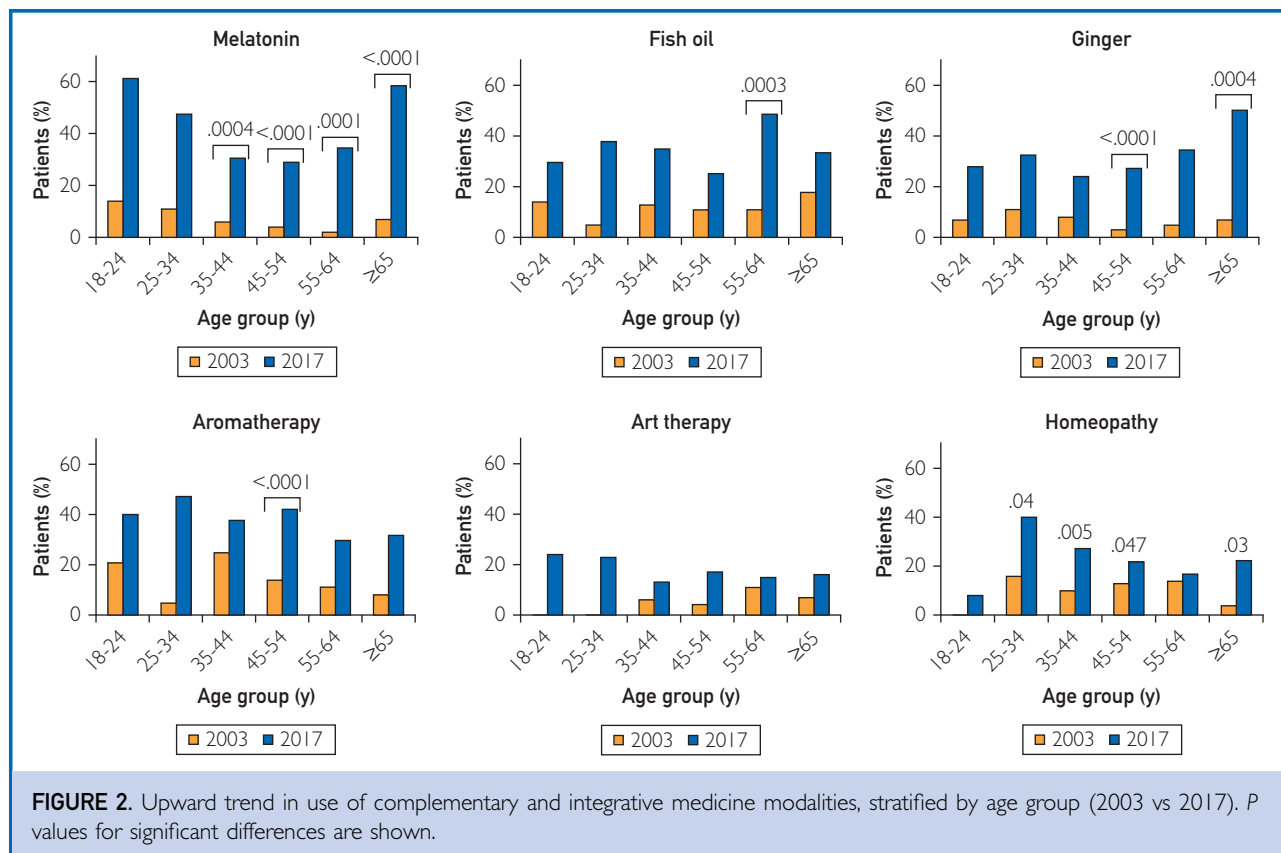


FIGURE 2. Upward trend in use of complementary and integrative medicine modalities, stratified by age group (2003 vs 2017). P values for significant differences are shown.

Melatonin use significantly increased among the 4 oldest age groups ($P=.0004$, $P<.0001$, $P=.0001$, and $P<.0001$ for age groups 35-44, 45-54, 55-64, and ≥ 65 years, respectively). Fish oil use increased significantly in the 55 to 64 age group ($P=.0003$). Aromatherapy use increased significantly among the 45 to 54 age group ($P<.0001$), and the use of ginger increased significantly among the 45 to 54 and 65 or older age groups ($P<.0001$) and $P=.0004$, respectively.

Most Frequently Used CIM Modalities by Generations

We identified the 10 most common CIM modalities for respondents to the 2003 and 2017 surveys. We ranked these modalities within each generational category, with generations defined as follows: young adults (18-34 years), middle-aged adults (35-54 years), and older adults (>54 years). Figure 3 depicts the most common modalities for each surveyed year, ranked from most to least common within each generation.

In 2017, massage and spiritual healing were among the top 3 modalities for each generational category. In 2003 and 2017, massage, spiritual healing, chiropractic treatments, exercise for a specific medical problem, vitamin B complex, and magnesium were consistently used among all generations. In 2017, melatonin use was more popular among millennials.

DISCUSSION

To our knowledge, this report describes the first study comparing similarities and differences in the prevalence and patterns of CIM use among patients with FM over an extended (14-year) period. This study documents the prevalence of CIM use in 2017 (among various age groups and generational categories) and shows that use of many types of CIM increased from 2003 levels. By using our previously published methods and survey instrument, we had the unique opportunity not only to assess the current climate of CIM use among patients with FM but also to directly

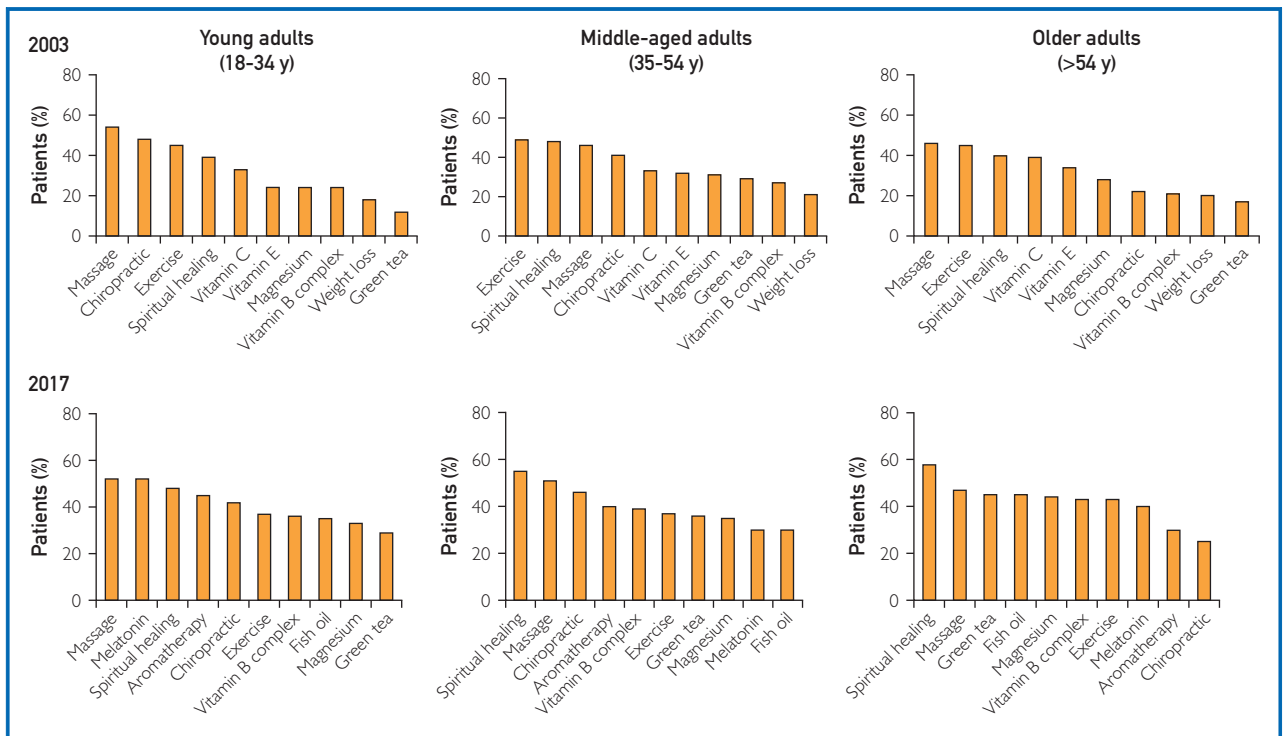


FIGURE 3. Most frequently used complementary and integrative medicine modalities, stratified by adulthood stage (2003 vs 2017). Age groups were defined as follows: young adults (18-34 years), middle-aged adults (35-54 years), and older adults (>54 years).

measure any changes that occurred during the interval period. When comparing the results of our 2003 and 2017 surveys, we noted several major differences in use, which spanned all 3 CIM domains (treatments and techniques, vitamins and minerals, and herbs and other dietary supplements).

We noted a significant increase in the proportion of respondents who used at least one treatment or technique ($P < .0001$) (Supplemental Table 1, available online at <http://www.mcpiqjournal.org>). Specifically, we noted significant increases in the use of art therapy, aromatherapy, and homeopathic medicine (all $P < .0001$). We noted other increases (relaxation therapy, acupuncture, and magnetic therapy), but they were not statistically significant changes ($P = .002$, $P = .003$, and $P = .004$, respectively). Art therapy, an emerging integrative and stimulating therapy option for various pain-related conditions, has demonstrated benefits for improving pain, quality of life, and psychological outcomes.^{26–28} Aromatherapy has been identified by a survey study of patients with FM as one of the most effective adjunctive treatment options (90% of patients surveyed reported effectiveness of aromatherapy on their overall FM symptoms);²⁹ thus, it has been suggested as an integrative therapy.³⁰ Several clinical trials of aromatherapy have reported successful pain management in various patient groups,^{31–33} and a systematic review reported that aromatherapy can be used successfully in pain management (evidenced by a significant reduction in reported pain on a visual analog scale) as an integrative adjunct to conventional treatments.³⁴ This systematic review further noted that aromatherapy more effectively treated nociceptive and acute pain compared with inflammatory or chronic pain.³⁴ Mixed results have been reported for homeopathic treatments. Some review data have suggested potential health benefits from homeopathy in FM (specifically as it pertains to tender point count, pain intensity, and fatigue),³⁵ but another study was unable to draw any definitive conclusions.³⁶

In terms of vitamins and minerals, we observed major changes in the use of several vitamins (Supplemental Table 2, available online at <http://www.mcpiqjournal.org>). Specifically, we noted a significant increase

in the use of vitamin B complex ($P = .0002$) and a significant decrease in the use of vitamin E ($P < .0001$). This latter finding is a prime example of the direct impact of research on patient-directed self-care. Vitamin E use declined as evidence increasingly suggested that it did not have a beneficial role in cancer or cardiovascular diseases and might be associated with numerous medication interactions.³⁷

We observed a notable increase in the use of herbal or dietary supplements (Supplemental Table 3, available online at <http://www.mcpiqjournal.org>). Specifically, we noted significant increases in the use of melatonin, fish oil, garlic, ginger, and flaxseed (all $P < .0001$). We further noted nonsignificant increases in the use of green tea ($P = .003$), acidophilus ($P = .0005$), and L-lysine ($P = .001$) and a decrease in the use of chondroitin ($P = .004$). Melatonin has antinociceptive, anti-inflammatory, and analgesic properties and has an important role in the pathophysiology of pain;^{38–40} therefore, it may be an effective tool in the management of FM-related musculoskeletal pain.^{41,42} In reserpine-induced FM in rats, melatonin reduced oxidative stress, inflammatory musculoskeletal changes, and difficulties with motor activity.⁴¹ The efficacy of melatonin in humans with FM has been documented in several clinical trials (reduced tender point count, severity of pain, and Fibromyalgia Impact Questionnaire score; improved sleep quality), with a high level of confirmation^{38,43–45} and limited adverse effects.³⁸ For fish oil, studies of nationally representative samples have revealed substantial use among middle-aged women.⁴⁶ In fact, the prevalence of fish oil use increased by 4-fold among older adults during a 5-year period.⁴⁷ Although investigators have obtained some promising results for fish oil as an adjuvant therapy in rheumatoid arthritis^{48,49} and neuropathic pain management,⁵⁰ more research is needed to evaluate its efficacy for FM symptom management. Ginger, with its analgesic and anti-inflammatory properties, has been widely used for more than 2500 years.^{51–56} Several studies have reported the efficacy of ginger in various inflammatory and pain-related conditions, and the authors of those studies recommend it as a suitable supplementary agent.^{57–59} In an experimental mouse model

of FM, ginger improved numerous FM-related symptoms, including allodynia, hyperalgesia, cognitive disturbances, anxiety, and depression.⁵³ Garlic also has anti-inflammatory and analgesic properties and has been widely used since the Middle Ages. A recent review described numerous potential medical uses for garlic that ranged from acute inflammatory conditions (arthritis and hepatic injury) to migraines and vascular diseases.^{60,61} Flaxseed, which contains fiber, has been consumed for thousands of years. Recent studies have documented its potential medical efficacy for constipation, hyperlipidemia, diabetes mellitus, and cancer.⁶² The National Center for Complementary and Integrative Health is currently studying the potential role of flaxseed in inflammatory conditions. However, these studies and their results are quite heterogeneous, use different methodologies, and often have weak evidence supporting their conclusions. Furthermore, there is a paucity of data regarding the role and effectiveness of many of these herbal or dietary supplements, including ginger, garlic, or flaxseed, specifically in FM.

Importantly, the prevalence of any kind of CIM use among patients with FM was nearly 100%. Considering the trends in use over the 14 years between our 2 studies, we believe that CIM use is firmly rooted in our patients with FM and is here to stay. What originally began as “alternative” treatment options has slowly, with the aid of ongoing research, assimilated into conventional medical practice and is now considered “complementary” and “integrative.” As such, it is imperative for health care professionals to be aware of these various treatment options and to be familiar with their associated basic efficacies, indications, and risks. Clinicians need to develop an effective strategy to screen patients for CIM use, assess CIMs for possible drug interactions, continually monitor for treatment efficacy (as would be done with all conventional treatments), and provide appropriate counsel. Two comprehensive online resources for clinicians include the National Center for Complementary and Integrative Health website (<https://nccih.nih.gov>) and the Natural Medicines Comprehensive Database (<http://naturaldatabase.therapeuticresearch.com/home.aspx?cs=&rs=ND>).

Another interesting finding of this study is that the current use of various CIM modalities

differed considerably between younger and older patients with FM (Supplemental Tables 1-3 [available online at <http://www.mcpiqjournal.org>]) and across generational categories (Figure 3). All generational categories of patients with FM reported increased CIM use overall compared with the 2003 cohort. The reasons underlying the high prevalence and increasing use of some CIM modalities in patients with FM is likely multifactorial, including the limited response to conventional treatment options, availability of CIM modalities, limited associated adverse effects, low cost, and the perplexing nature of FM symptoms, which often causes patients to seek other treatment options.^{23,63–65} Our results also highlight that patients with FM are aware of and actively pursuing integrative medicine options, usually without the knowledge of their health care professional, due in part to the advancement of greater internet accessibility, improved evidence-based information available online, and online health information-seeking behavior.^{66–68} We hypothesize that the differences in rates of use of various CIM modalities across generational categories and age also are likely multifactorial. A recent study found that although the sociodemographic characteristics associated with CIM use overall was highest in female, middle-aged, and higher-educated individuals, these characteristics differed significantly by specific disease.⁶⁹ A subset analysis of that study concluded that people with musculoskeletal diseases use significantly greater CIM modalities across all sociodemographic variables (age, sex, educational level).⁶⁹ In contrast, we identified differences in CIM use rates among our FM cohort (based on age and generational category), which we hypothesize could be due to differences in age or generational familiarity, acceptance, and willingness to try certain CIM modalities; differences in exposure to various CIM options partly due to variable health information-seeking behavior and possible variations in health care professional or facility acceptance, endorsement, and availability of CIM modalities; and socioeconomic variables. Further studies should explore age and generational variations by using a large sample size and preferably qualitative methodologies.

We acknowledge some limitations to the study, which was a survey of referral-based patients at a single academic medical center.

Although we compared survey results of 2 similar cross-sectional groups, future longitudinal, multicenter studies with a larger sample size would provide better understanding of trends in CIM use. Our survey results may have some selection bias, with referral-based patients at an academic center potentially being more knowledgeable and accepting of CIM options compared with other population groups. Another limitation is the exclusion of several popular CIM modalities such as tai chi and yoga. We aimed to maintain consistency with our original 2003 survey, which also excluded those factors. Although we remained consistent in our methodology, we acknowledge that these omissions specifically could have affected our results, potentially leading to an even higher rate of CIM usage. Finally, high-quality, controlled clinical trials with robust study designs are needed to identify the efficacy of CIM therapies for patients with FM.

CONCLUSION

Our results indicate a rising trend in the use of some CIM therapies among patients with FM across age and generational categories. Thus, it is imperative for health care professionals to be aware of and knowledgeable about these various modalities. In time, incorporation of these integrative options into a multifaceted treatment regimen may improve symptom management for patients with FM.

ACKNOWLEDGMENTS

We give our sincerest gratitude to all the patients with FM who volunteered to participate in the study. We also thank Ms Courtney L. Johnson for her assistance throughout the study. Editing, proofreading, and reference verification for the submitted manuscript were provided by Scientific Publications, Mayo Clinic.

SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at <http://www.mcpiqjournal.org>. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviations and Acronyms: CIM = complementary and integrative medicine; FM = fibromyalgia; FTP = fibromyalgia treatment program

Potential Competing Interests: The authors report no competing interests.

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