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## Use of Complementary Health Approaches for Musculoskeletal Pain Disorders Among Adults: United States, 2012

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### Abstract

**Objective**—This report examines the use of complementary health approaches among U.S. adults aged 18 and over who had a musculoskeletal pain disorder. Prevalence of use among this population subgroup is compared with use by persons without a musculoskeletal disorder. Use for any reason, as well as specifically to treat musculoskeletal pain disorders, is examined.

**Methods**—Using the 2012 National Health Interview Survey, estimates of the use of complementary health approaches for any reason, as well as use to treat musculoskeletal pain disorders, are presented. Statistical tests were performed to assess the significance of differences between groups of complementary health approaches used among persons with specific musculoskeletal pain disorders. Musculoskeletal pain disorders included lower back pain, sciatica, neck pain, joint pain or related conditions, arthritic conditions, and other musculoskeletal pain disorders not included in any of the previous categories. Respondents could report having more than one disorder.

**Results**—In 2012, 54.5% of U.S. adults had a musculoskeletal pain disorder. The use of any complementary health approach for any reason among persons with a musculoskeletal pain disorder (41.6%) was significantly higher than use among persons without a musculoskeletal pain disorder (24.1%). Among adults with any musculoskeletal pain disorder, the use of natural products for any reason (24.7%) was significantly higher than the use of mind and body approaches (15.3%), practitioner-based approaches (18.2%), or whole medical system approaches (5.3%). The pattern of use of the above-mentioned groups of complementary health approaches was similar for persons without a musculoskeletal disorder. However, prevalence of use among these persons was significantly lower compared with persons with a musculoskeletal disorder.

For treatment, the use of practitioner-based approaches among persons with any musculoskeletal pain disorder (9.7%) was more than three times as high as the use of any other group of approaches (0.7%–3.1%). The patterns of use of specific groups of complementary health approaches also differed among specific musculoskeletal pain disorders.

**Keywords:** arthritis • back pain • sciatica • National Health Interview Survey

### Introduction

Pain is a leading cause of disability and a major contributor to health care utilization (1). Pain is often associated with a wide range of injury and disease. It is also costly to the United States, not just in terms of health care expenses and disability compensation, but also with respect to lost productivity and employment, reduced incomes, lost school days, and decreased quality of life (2). The focus of this report is on somatic pain affecting the body's musculoskeletal tissues (musculoskeletal pain disorders) and the use of different types of complementary health approaches by persons who are affected. In order to better understand differences in use among this population subgroup, this report compares the use of complementary health approaches among those with a musculoskeletal disorder with use among those without a musculoskeletal disorder.

Musculoskeletal pain disorders include a wide range of acute and chronic injuries or inflammatory conditions that cause pain in the body's joints; ligaments; muscles; nerves; tendons; and structures that support the limbs, neck, and back (3). These disorders can impair daily functioning and are some of



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the leading causes of physical disability in the United States (4). Conventional medical treatment for chronic musculoskeletal pain (e.g., nonsteroidal anti-inflammatory drugs and surgery) and use of opioids often lack long-term benefit or subject patients to other risks (5–7). Consequently, some persons with these conditions may seek alternative treatment options. Alternative health care interventions (e.g., chiropractic and osteopathic medicine), products (e.g., herbs and natural products), or practices (e.g., massage therapy and yoga) not generally considered part of conventional medicine may collectively be referred to as complementary health approaches.

There is increasing clinical trial evidence for the efficacy of some complementary health approaches in treating specific musculoskeletal pain disorders (7). However, there have been inconsistencies in the experimental designs and diagnostic criteria used in patient selection for many of these clinical trials (7,8). As a result, there is some discord among the clinical research community regarding the efficacy of some of these approaches for various musculoskeletal pain disorders (5,7–10). Despite this, examining which groups of approaches are being used by persons with individual musculoskeletal pain disorders may better inform physician-patient dialogue and priority-setting efforts for clinical researchers.

Data from population-based surveys on the use of complementary health approaches in the United States now span 20 years (11–13). The 2002 National Health Interview Survey (NHIS) provided the first nationally representative estimates of adult use of complementary health approaches based on data collected from in-person interviews (14). Since then data on the use of complementary health approaches in the general U.S. population, collected periodically by NHIS, have been used by numerous researchers (11,15–17). To better understand the patterns of use of complementary health approaches among U.S. adults with musculoskeletal pain disorders, this report presents estimates of the use of complementary health approaches for any reason, as well as estimates for the subset of these adults who used these approaches specifically

for treatment of their musculoskeletal pain disorders. Comparisons are also made for persons with specific musculoskeletal pain disorders.

## Methods

### Data source

Data from the 2012 NHIS were used for this analysis. NHIS is a nationally representative, cross-sectional household interview survey that is fielded continuously by the National Center for Health Statistics and produces annual estimates of the health of the U.S. civilian noninstitutionalized population. Interviews are conducted in respondents' homes, but follow-ups to complete interviews may be conducted over the telephone. A detailed description of the 2012 NHIS sample design and the survey questionnaire is available elsewhere (18). The Household and Family Core of NHIS collect health and sociodemographic information on each member of all families residing within a sampled household. Within each family, additional information is collected from one randomly selected adult (the "sample adult") aged 18 and over through the Sample Adult Core. The most recent Adult Alternative Medicine (ALT) supplement was administered to sample adult respondents in 2012. The ALT supplement, sponsored by the National Institutes of Health's National Center for Complementary and Integrative Health (NCCIH), was implemented in order to provide a national data source on complementary medicine use.

Information on the use of complementary health approaches in the past 12 months was collected from a sample of 34,525 adults aged 18 and over who participated in the ALT supplement, while the information on musculoskeletal pain disorders was obtained from the Sample Adult Core. In 2012, the sample adult response rate was 79.7%, with 34,525 adults completing the NHIS interviews. The ALT supplement questions are embedded in the NHIS sample adult module and are administered to all sample adults. The processes used to field the ALT supplement have been

previously described (19). The study sample included 19,236 adults who reported having one or more individual musculoskeletal pain disorders in the past 3 months. Respondents were asked not to report aches and pains that are fleeting or minor. Only persons with pain that lasted a whole day or more were included in these analyses. Questions about the individual musculoskeletal pain disorders discussed in this report are located in the "Definition of terms" section at the end of this report.

## Complementary Health Approaches

Survey respondents were asked about their use of up to 23 named approaches in the past 12 months. Use of complementary health approaches for any reason was determined by a positive response to having used or having seen a practitioner for a complementary health approach during the past 12 months, regardless of reason for use. For the three most frequently used approaches for each individual, persons were then asked if, during the past 12 months, they used the specific named approach "for one or more specific health problems, symptoms, or conditions." Those who responded yes were asked "for what health problems, symptoms, or conditions did you see a practitioner" or use the specific named approach. There was no predetermined list of conditions for this question, so interviewers recorded the conditions as reported by respondents. This report only includes responses to whether the three most frequently named approaches were used for treatment of individual musculoskeletal pain disorders. Use for treatment of nonmusculoskeletal pain disorders was not analyzed separately. Use of complementary health approaches for any reason includes use for treatment of a musculoskeletal pain disorder.

For this report, the use of *any* complementary approach includes the use of one or more of the following during the past 12 months: acupuncture; Alexander technique; Ayurveda; biofeedback; chelation therapy; chiropractic or osteopathic manipulation; energy healing therapy; Feldenkrais; guided imagery; homeopathic treatment;

hypnosis; naturopathy; nonvitamin, nonmineral dietary supplements; massage therapy; meditation; Pilates; progressive relaxation; traditional healers; Trager psychophysical integration; qi gong; tai chi; or yoga.

Approaches were further grouped by similar mode of practice or administration for analyses: natural products (nonvitamin, nonmineral dietary supplements and special diets); practitioner-based (Alexander technique, chiropractic or osteopathic manipulation, Feldenkrais, massage therapy, and Trager psychophysical integration); mind and body approaches (biofeedback, energy healing therapy, guided imagery, hypnosis, meditation, progressive relaxation, Pilates, tai chi, qi gong, and yoga); and whole medical systems (Ayurveda, acupuncture, homeopathy, naturopathy, and traditional healers). Information on use of each type of approach was collected on an individual basis. More information about specific health approaches is available from NCCIH at: <https://nccih.nih.gov/health/integrative-health>.

## Musculoskeletal Pain Disorders

Musculoskeletal pain disorders were examined as a collective group (any musculoskeletal pain disorder), as well as individually. The musculoskeletal pain disorders examined in this report include lower back pain without sciatica (this will be referred to as lower back pain), sciatica with back pain (referred to as sciatica), neck pain, non-arthritic joint pain or related conditions, arthritic conditions, and other musculoskeletal pain disorders not included in any of the previous categories. Arthritic conditions include several forms of arthritis: rheumatoid arthritis (an autoimmune disorder that first targets the lining of joints [synovium]); gout (an abnormal metabolism of uric acid, resulting in an excess of uric acid in the tissues and blood causing swollen joints); lupus (a chronic autoimmune disease that can damage any part of the body [skin, joints, or organs inside the body]); or fibromyalgia (a syndrome of common and chronic disorders characterized by

widespread pain, diffuse tenderness, and a number of other symptoms which result in pain in the muscles, ligaments, and tendons). Persons who responded “no” to having arthritis and “yes” to having joint pain or related conditions were categorized as having non-arthritic joint pain or related conditions.

Sciatica typically refers to pain that radiates along the path of the sciatic nerve, which branches from the lower back through the hips and buttocks and down each leg. In NHIS, sciatica was identified by a “yes” response to the question, “During the past 3 months, did you have low back pain?” and “Did this pain spread down either leg to areas below the knees?” Only respondents who answered “yes” to both questions were defined as having sciatica. Back pain was defined by a response to the initial question only. Other musculoskeletal problems include muscle or bone pain, sprain or strain, and jaw pain. Persons could report having more than one musculoskeletal pain disorder.

## Statistical Analyses

The sample of persons with any musculoskeletal pain disorder included all adults aged 18 and over who responded “yes” to having one or more named musculoskeletal pain disorders surveyed on the NHIS sample adult module. The number of people with a positive response to having one or more of these musculoskeletal pain disorders (19,236) was the denominator for all questions pertaining to use of complementary health approaches among persons with any musculoskeletal pain disorder. The denominator for the use of complementary health approaches among persons with a specific musculoskeletal pain disorder was those who responded “yes” to having that specific disorder. Persons who reported using a complementary health approach to treat a musculoskeletal pain disorder in the ALT supplement had to respond “yes” to having the condition in the past 3 months in the sample adult module to be included in the numerator of analyses. Respondents could respond “yes” to having more than one specific musculoskeletal pain disorder. As such, the specific disorder subgroups are not

mutually exclusive. However, treatment is specific to each disorder. Persons who responded “no” to having any of the musculoskeletal pain disorders mentioned were used for comparison of the use of complementary health approaches among persons with a musculoskeletal pain disorder.

Groups of complementary health approaches (natural products, mind and body approaches, practitioner-based approaches, and whole medicine systems) are mutually exclusive. However, an individual could use multiple approaches and could be counted in more than one group of approaches. These persons were counted only once for use of any complementary health approach.

Analyses were conducted using SAS-callable SUDAAN version 11.0.0 (20), which accounts for the complex sample design of NHIS. All estimates for adults were weighted using the annual sample weights for adults and, so, are representative of the U.S. civilian noninstitutionalized population of adults aged 18 and over. Data weighting procedures are described in more detail elsewhere (21). Calculations of estimates excluded persons with missing information for musculoskeletal pain disorders or use of complementary health approaches. The Taylor series linearization method was chosen for estimation of standard errors. Estimates were considered reliable if the relative standard error (RSE) was less than 30%. Statistical tests performed to assess the significance of differences between estimates were two-tailed tests with no adjustments made for multiple comparisons.

## Strengths and Limitations of the Data

A major strength of these analyses is that the data are from a nationally representative sample of U.S. adults, allowing for population estimates. The large sample size allows for estimation of the use of complementary health approaches among subgroups of U.S. adults with self-reported musculoskeletal pain disorders, both of which are collected in NHIS.

The data in this report also have some limitations. NHIS does not collect information on the specific dates of use of complementary health approaches or of the incidence date for the musculoskeletal pain disorders, so it is not possible to determine if use occurred prior to having a musculoskeletal pain disorder. NHIS also does not collect information on simultaneous treatment of these disorders with mainstream or conventional medicine. Responses are dependent on participants' recall of complementary health approaches that they used in the past 12 months, as well as their willingness to report their use accurately.

## Results

More than 50% of U.S. adults (125 million) had a musculoskeletal pain disorder in 2012 (Figure 1). Just over 20% of U.S. adults had arthritic conditions (22.1%) or lower back pain (20.3%). A smaller percentage of persons reported having non-arthritic joint pains or other joint conditions (17.5%) and neck pain or problems (14.3%), and an even smaller percentage had sciatica (9.8%). A significant proportion of the population reported having at least one other musculoskeletal problem that was not examined independently (28.1%). The proportion of persons with each musculoskeletal pain disorder illustrated in Figure 1 are the subpopulations for subsequent analyses shown in Figures 2–6.

More than 40% of adults with a musculoskeletal pain disorder used a complementary health approach for any reason in 2012 (Figure 2). This was significantly higher than use among persons without a musculoskeletal pain disorder (24.1%). Use of complementary health approaches for any reason among persons with neck pain or problems was more than twice as high as use among persons without these problems. Among adults with a musculoskeletal pain disorder, use of any complementary health approach was highest among those with neck pain or problems (50.6%), followed by persons with other musculoskeletal problems (46.2%). The use of any complementary health approach was significantly lower among adults with sciatica (41.9%), arthritic conditions (40.9%), and lower back pain (43.0%).

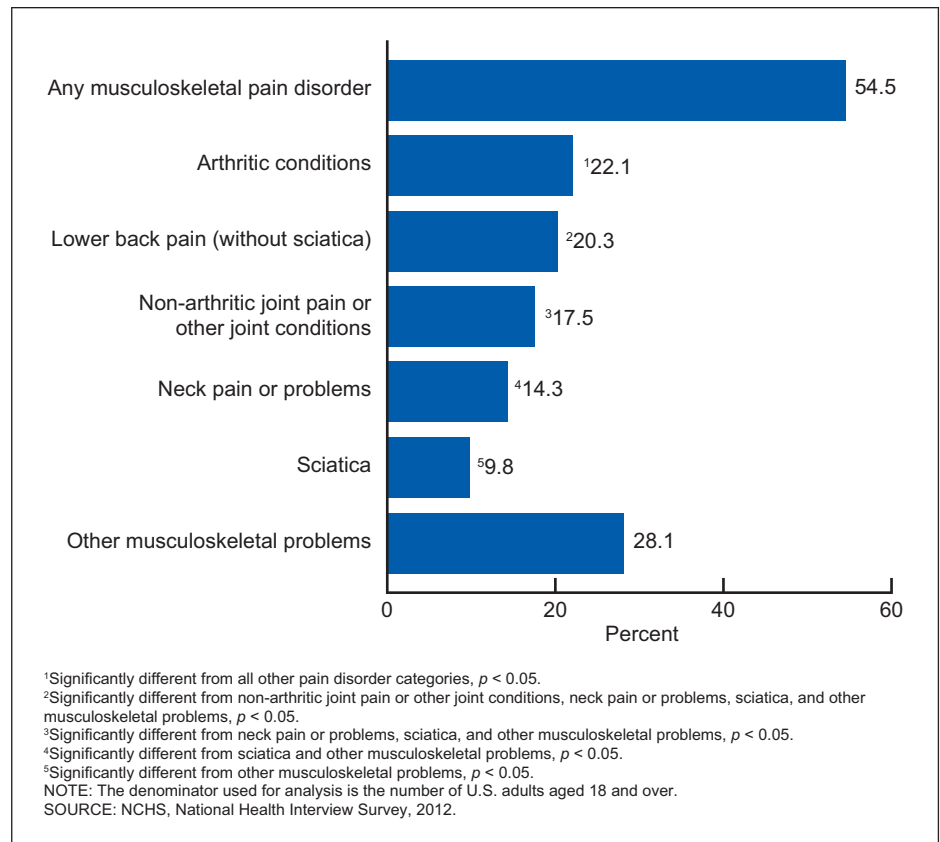


Figure 1. Prevalence of musculoskeletal pain disorders among adults in the past 12 months: United States, 2012

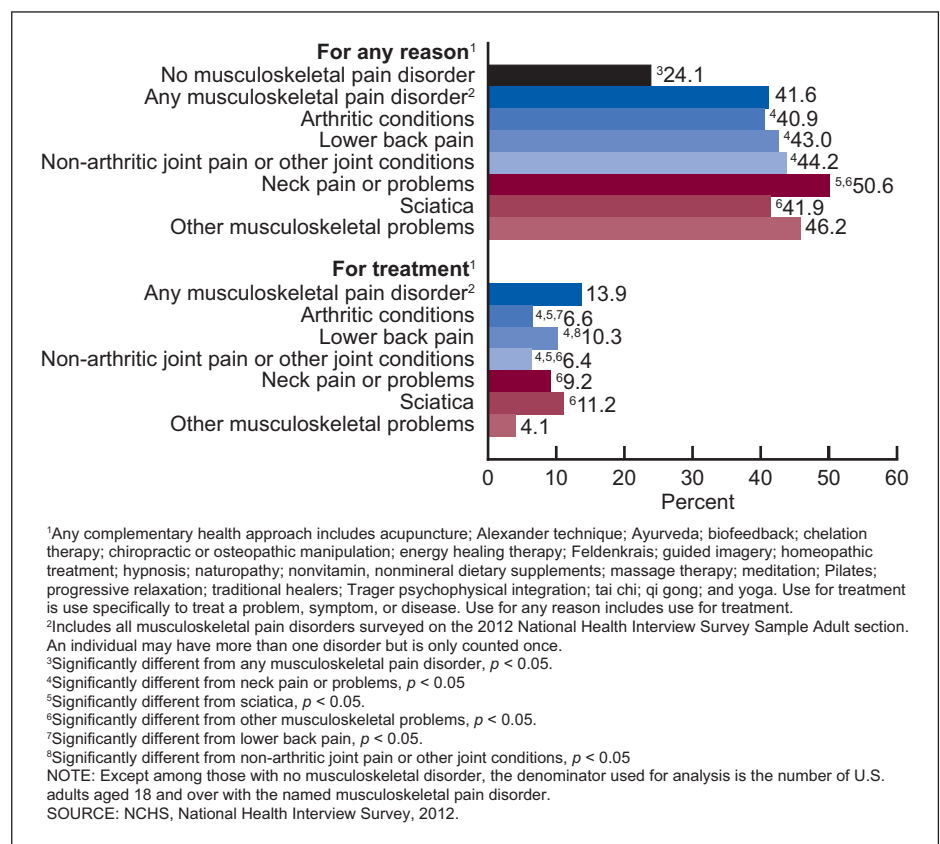


Figure 2. Use of any complementary health approach in the past 12 months for any reason and for treatment among adults: United States, 2012

Among adults with a musculoskeletal pain disorder, almost 14% used a complementary health approach for treatment. Persons with neck pain or problems (9.2%), lower back pain (10.3%), and sciatica (11.2%) were more likely to use a complementary health approach to treat their disorder compared with those with non-arthritic joint pain or other joint conditions (6.4%), arthritic conditions (6.6%), and other musculoskeletal problems (4.1%).

In 2012, almost 25% of persons with any musculoskeletal pain disorder used natural products (nonvitamin, nonmineral dietary supplements and special diets) (Figure 3). This was almost twice as high as use among persons without a musculoskeletal pain disorder (13.4%). Use of complementary health approaches for any reason was more than twice as high among persons with non-arthritic joint pain and other joint conditions (27.7%), neck pain or problems (27.7%), and other musculoskeletal problems (28.2%) compared with those without a musculoskeletal pain disorder.

There was no significant difference in the use of natural products among persons with sciatica (24.1%) and those with lower back pain (23.2%). Use of natural products was significantly lower among persons with lower back pain when compared with persons with all other individual musculoskeletal pain disorders examined, except sciatica.

However, few complementary health users used these approaches specifically for treatment of their musculoskeletal pain disorder. Approximately 3% of adults with any musculoskeletal pain disorders used natural products to treat one or more of these disorders. Adults with arthritic conditions (3.3%) and non-arthritic joint pain and other joint conditions (2.9%) were significantly more likely to use natural products for treatment of these conditions than individuals with other musculoskeletal pain disorders and other musculoskeletal problems (0.5%).

In 2012, more than 15% of persons with any musculoskeletal pain disorder used a mind and body approach such as biofeedback, meditation, or yoga for any reason (Figure 4). This was almost one-third higher than use among persons without a musculoskeletal

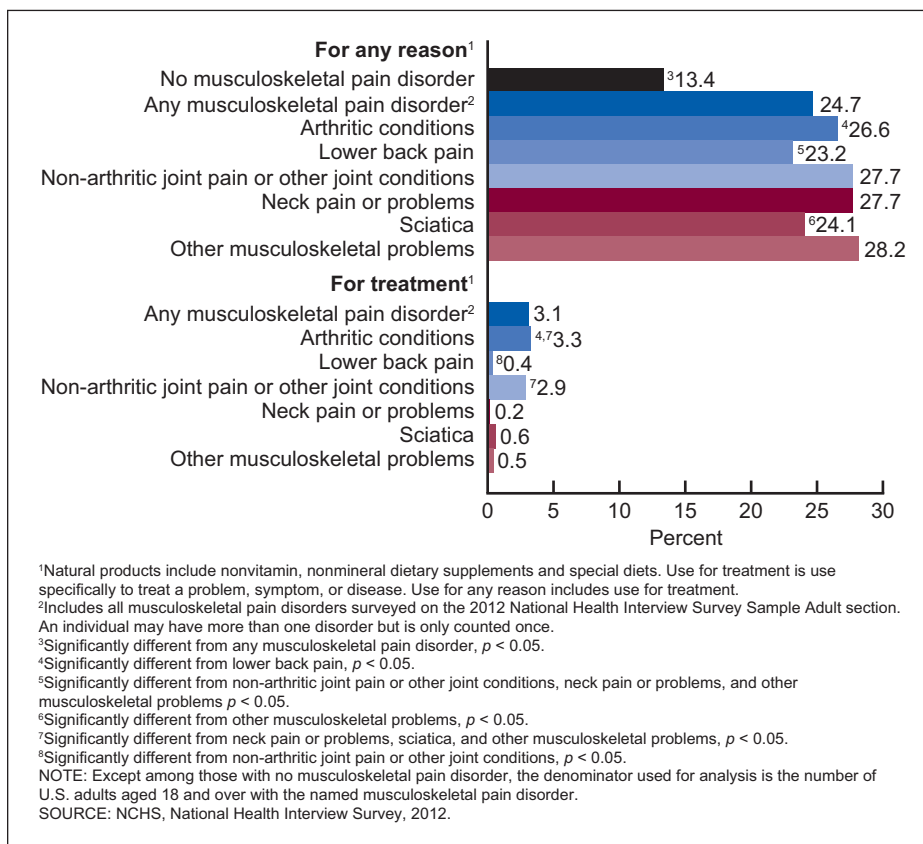


Figure 3. Use of natural products in the past 12 months for any reason and for treatment among adults: United States, 2012

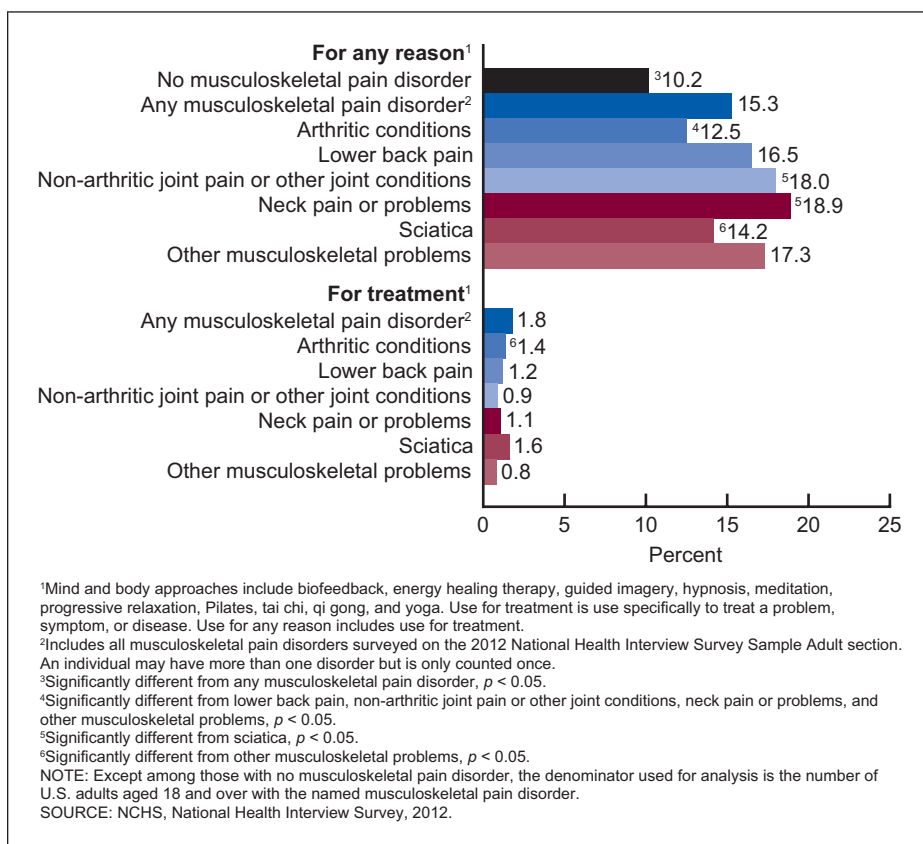


Figure 4. Use of mind and body approaches in the past 12 months for any reason and for treatment among adults with specific musculoskeletal pain disorders: United States, 2012

pain disorder (10.2%). Use of mind and body approaches among persons without a musculoskeletal pain disorder was also lower than use among persons with individual musculoskeletal pain disorders.

Use of mind and body approaches for any reason varied among persons with individual musculoskeletal pain disorders. Use by persons with neck pain or problems (18.9%), non-arthritic joint pain or other joint conditions (18.0%), and other musculoskeletal problems (17.3%) was significantly higher than use among persons with arthritic conditions (12.5%) or sciatica (14.2%).

Less than 2% of adults with a musculoskeletal pain disorder used mind and body approaches specifically for treatment. Use of mind and body approaches for treatment of these conditions was twice as high among persons with sciatica (1.6%) compared with persons with other musculoskeletal problems (0.8%).

In 2012, more than 18% of persons with any musculoskeletal pain disorder used a practitioner-based approach

for any reason (Figure 5). Use of practitioner-based approaches for any reason was almost twice as high among persons with any musculoskeletal pain disorders compared with persons without a musculoskeletal pain disorder. Persons with individual disorders were also more likely to use a practitioner-based approach for any reason compared with those with no musculoskeletal pain disorder.

Almost 30% of persons with neck pain or problems used a practitioner-based approach such as Alexander technique or chiropractic or osteopathic manipulation in the past 12 months. This was significantly higher than use among persons with all other types of musculoskeletal pain disorders. Persons with sciatica (19.8%), lower back pain (21.7%), and other musculoskeletal problems (20.8%) were significantly more likely to use practitioner-based approaches in the past 12 months compared with persons with arthritic conditions (17.4%) and non-arthritic joint pains or other joint conditions (16.8%).

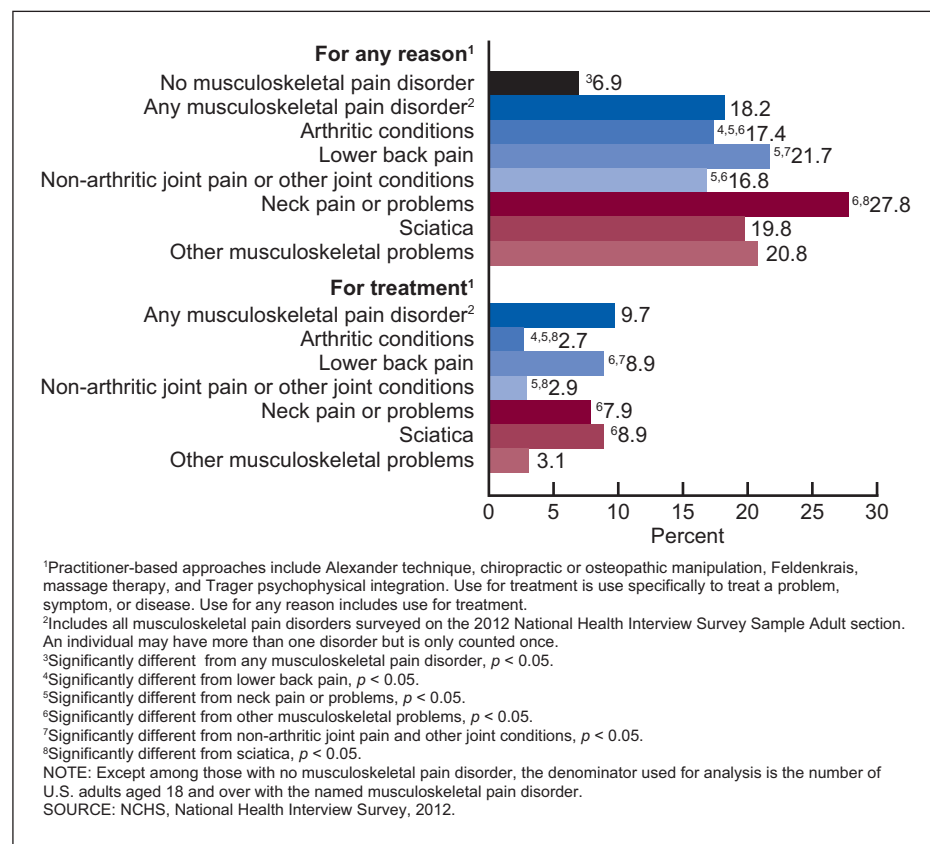
Just under 10% of adults with a musculoskeletal pain disorder used a practitioner-based approach specifically for treatment of that disorder. Persons with sciatica (8.9%), lower back pain (8.9%), and neck pain or problems (7.9%) were more likely to use practitioner-based approaches for treatment of these conditions than persons with arthritic conditions (2.7%), non-arthritic joint pains or other joint conditions (2.9%), and other musculoskeletal problems (3.1%).

In 2012, 5.3% of persons with any musculoskeletal pain disorder used whole medical systems for any reason (Figure 6). This was more than twice as high as persons without a musculoskeletal pain disorder. Persons with sciatica (6.8%) and neck pain or problems (8.0%) were most likely to use whole medical systems such as acupuncture and naturopathy in the past 12 months. There was no significant difference in use of whole medical systems among persons with arthritic conditions (5.1%), lower back pain (5.3%), non-arthritic joint pains and other joint conditions (6.0%), and other musculoskeletal problems (6.2%).

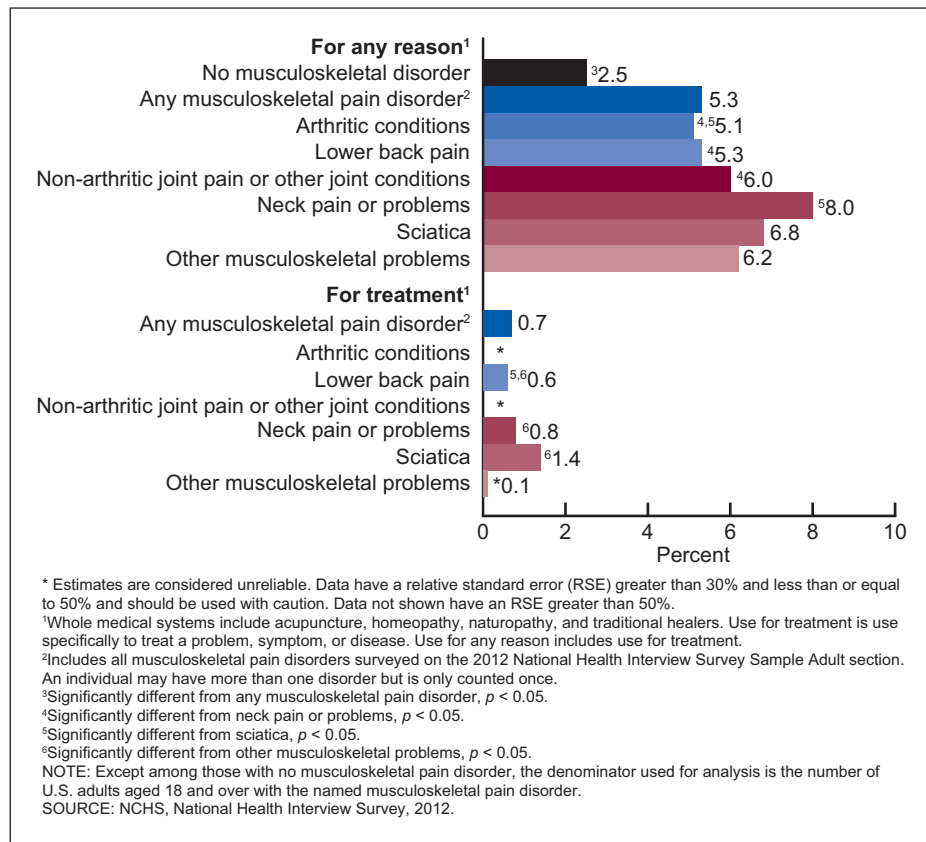
Overall, less than 1% of persons with any musculoskeletal pain disorder used whole medical systems specifically for treatment. Comparatively, persons with sciatica (1.4%) were more likely to use whole medical systems for treatment than persons with lower back pain (0.6%) and neck pain or problems (0.8%).

## Discussion

More than 50% of U.S. adults, that is, approximately 125 million Americans, suffer from one or more musculoskeletal pain disorders. The goal of pain management is usually to achieve maximum reduction in pain intensity as quickly as possible, to restore an individual's daily functioning, to help the patient cope with residual pain, and to assess for side effects of therapy (5,22). Complementary approaches are increasingly being integrated into conventional treatment plans for some health conditions. More than 50% of medical schools offer some instruction in complementary health approaches (23), and a growing body of scientific evidence suggests that several of these approaches,



**Figure 5. Use of practitioner-based approaches in the past 12 months for any reason and for treatment among adults: United States, 2012**



**Figure 6. Use of whole medical systems in the past 12 months for any reason and for treatment among adults: United States, 2012**

including chiropractic manipulation, acupuncture, massage, and yoga, may help to manage some painful conditions (24–31).

In 2012, 41.6% of adults with a musculoskeletal pain disorder used one or more complementary health approaches. This is significantly higher than the use among adults without a musculoskeletal pain disorder (24.1%). An even higher prevalence of use was seen among persons who had neck pain and problems (50.6%) and other musculoskeletal problems (46.2%).

Natural products were the most common complementary health approach used among U.S. adults with one or more musculoskeletal pain disorders; 24.7% of adults with musculoskeletal pain disorders used natural products. This was almost twice the use among persons without a musculoskeletal pain disorder (13.4%). However, use of natural products specifically for treatment among adults with musculoskeletal pain disorders was less than 4%.

The use of practitioner-based approaches for any reason among

persons with any musculoskeletal pain disorder (18.2%) was almost three times as high as among persons without a musculoskeletal pain disorder (6.9%). Regarding treatment of musculoskeletal pain disorders, the prevalence of use of practitioner-based approaches (9.7%) was more than three times that of use of other types of complementary health approaches among persons with any musculoskeletal pain disorder. Use of practitioner-based approaches was more than five times the use of other approaches among persons with neck pain or problems, lower back pain, sciatica, and other musculoskeletal problems.

The use of the selected complementary health approaches examined varied among persons with arthritis and non-arthritic joint pain and other conditions. However, these persons were consistently more likely to treat their conditions with natural products and practitioner-based approaches than with mind and body approaches.

Whole medical systems involve complete systems of theory and practice

that have evolved independently from, or parallel to, conventional medicine (32). However, although whole medical systems share a number of common elements with conventional medicine, use of these approaches for any reason or for treatment of musculoskeletal pain disorders was less popular than other types of approaches.

This report adds to evidence regarding the use of complementary approaches to treat or manage pain in the U.S. population. The high level of use of practitioner-based approaches identified in this report adds to previous research that has shown that some U.S. adults use complementary health approaches for treatment despite a lack of health insurance coverage for their complementary health practitioner visits (33). As such, the information in this report may be useful to clinicians and researchers interested in the types of complementary health approaches most frequently used for musculoskeletal pain management, and in implementing the 2016 National Pain Strategy, which lays out a plan for better addressing pain issues in the United States (5).

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## Technical Notes

### Definition of terms

*Arthritic conditions*—Based on a positive response to “Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?”

*Lower back pain without sciatica*—Based on a positive response to “During the past 3 months, did you have low back pain?” However, persons who subsequently responded “yes” to a question about lower back pain spreading down to the legs and areas below the knees were excluded from this subgroup.

*Mind and body approaches*—Includes biofeedback, energy healing therapy, guided imagery, hypnosis, meditation, progressive relaxation, Pilates, tai chi, qi gong, and yoga.

*Natural products*—Includes nonvitamin, nonmineral dietary supplements and special diets.

*Neck pain*—Based on a positive response to “During the past 3 months, did you have neck pain?” Respondents were instructed to refer to pain that lasted a whole day or more, and not report aches and pains that were fleeting or minor.

*Neuropathic pain*—Pain caused by injury or malfunction to the spinal cord and peripheral nerves.

*Non-arthritic joint pain or other joint conditions*—Based on a positive response to “During the past 30 days, have you had any symptoms of pain, aching, or stiffness in or around a joint?” Respondents were instructed to exclude back or neck pain. Persons with a positive response who subsequently responded “yes” to ever being told by a doctor or other health professional that they have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia were excluded from this subgroup.

*Other musculoskeletal conditions*—Includes a positive response to “During the past 3 months, did you have facial ache or pain in the jaw muscles or the joint in front of the ear?” “During the past 12 months, have you had any severe sprains or strains?” and “During the past 12 months, have you had other muscle or bone pain?”

*Practitioner-based approaches*—Includes Alexander technique, chiropractic or osteopathic manipulation, Feldenkrais, massage therapy, and Trager psychophysical integration.

*Sciatica with back pain*—Based on a positive response to “During the past 3 months, did you have low back pain?” and “Did this pain spread down either leg to areas below the knees?” Only respondents who answered “yes” to both questions were defined as having sciatica. Persons with sciatica were distinct from those with lower back pain without sciatica.

*Somatic pain*—Pain caused by the activation of pain receptors in either the body surface or musculoskeletal tissues.

*Visceral pain*—The pain felt when internal organs are damaged or injured. Visceral pain is caused by the activation of pain receptors in the chest, abdomen, or pelvic areas.

*Whole medical systems*—Includes Ayurveda, acupuncture, homeopathy, naturopathy, and traditional healers.





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