

Exploring the Association Between Complementary and Alternative Medicine and Emotional Health in Adults with Chronic Pain

An estimated 20.9 percent or 51.6 million adults in the United States suffer from pain lasting longer than three months.¹ Chronic pain can cause debilitating symptoms that significantly affect health and well-being.² Adults with chronic pain experience higher levels of anxiety, depression, fatigue, and insomnia compared to adults who do not suffer from pain.³ Traditional methods for managing chronic pain include medications, physical and occupational therapy, injection therapies, and exercise.⁴

Complementary and alternative medicine (CAM) consists of non-traditional interventions that can alleviate pain and restore function.⁵ CAM therapies such as relaxation, guided imagery, acupuncture, and biofeedback are effective treatments for relieving adult chronic pain.⁶ Previous research has thoroughly analyzed the connection between CAM and chronic pain. There is limited research exploring the utilization of CAM techniques to improve emotional health and alleviate chronic pain. The present study aimed to assess the impact on emotional health for adults receiving complementary and alternative therapies for pain and determine if a relationship exists between CAM use for chronic pain and emotional well-being.

People suffering from chronic pain are more likely to have recurring depressive episodes.⁷ This research is relevant to social work practice as clinical social workers intervene with adults seeking help for emotional or mental health problems. Healthcare social workers aim to help clients with chronic pain find therapies that may help their pain and associated emotional and mental health issues. Numerous studies demonstrate the use of cognitive-behavioral approaches to manage mental health problems related to chronic pain. However, more information is needed on how CAM approaches to chronic pain impact mental health and well-

being. This knowledge will enhance social workers' ability to confidently use or recommend complementary and alternative therapies, benefitting clients by providing more interventions for adults seeking help with emotional problems related to chronic pain.

Literature Review

The Problem

Pain that persists for longer than three months is chronic.⁸ Health-related quality of life (HRQoL) assesses an individual's physical, mental, emotional, and social functioning.⁹ While chronic pain can cause patients to suffer for years, patients with pain for three to six months already have a low HRQoL.¹⁰ Chronic pain has the associated factors of lower employment and socioeconomic status and an increase in sleep disorders, anxiety, and depression.¹¹ As chronic pain becomes more severe, the rate of depression increases.¹² Anxiety prevalence increases more in some disorders with chronic pain than in others.¹³ Over half of people with chronic pain have associated anxiety and depressive symptoms.¹⁴

Scope

Chronic pain affects over 51 million adults in the US, and over 17 million people in the US experience high-impact chronic pain.¹⁵ High-impact chronic pain is chronic pain that substantially restricts daily activities.¹⁶ Only 10.4 percent of people with chronic pain in 2019 recovered and were pain-free a year later.¹⁷ Chronic pain costs the US over \$600 billion annually in medical treatments, disability payments, and lost productivity.¹⁸ These costs do not include the emotional, financial, relational, social, and spiritual stressors on individuals with chronic pain. Biomedical and traditional biopsychosocial models of pain have been ineffective in treating chronic pain and the associated mental health problems.¹⁹

Etiology

The problem of how to treat chronic pain and the associated emotional and mental health issues comes from the differences in perspectives of healthcare professionals. Chronic pain management from a biomedical perspective typically consists of interventional procedures and prescription medications, which are costly, have risks and side effects, and can worsen emotional distress.²⁰ Psychological approaches to pain management usually involve therapies that target unhelpful thought processes, behavior patterns, and mood disturbances.²¹ These approaches do not treat biological pain. The original biopsychosocial pain model considers the person in their environment.²² However, it led to a prominent model that does not treat patients holistically as people with individual experiences.

The Biopsychosocial Model of Pain and The Fear-Avoidance Model of Chronic Pain

The originators of the first biopsychosocial model of pain, John Loeser and Gordon Waddell, had excellent intentions of viewing the patient as a whole person and considering the stresses of the environment impact a patient's social and psychological functioning along with their biological processes.²³ However, from this original model sprung the fear-avoidance model. According to the fear-avoidance model of chronic pain, once an acute pain incidence is over, the learned behavioral pattern (fear) from that pain leads to an exaggerated perception of pain.²⁴ This exaggerated perception of pain is theorized to lead to avoidance of activities due to fear of pain, which causes disability.²⁵ However, it does not take into consideration the biological component of chronic pain, nor does fear predict pain and disability in studies.²⁶

Solutions

Complementary and alternative medicine is a person-centered approach that promotes self-management of pain, taking into consideration care for the body, mind, and spirit.²⁷ A 2002

study states that 62 percent of US adults used CAM, with meditation, relaxation, yoga, tai chi, qi gong, hypnosis, and biofeedback being the most popular.²⁸ Participants using CAM report that the therapies help them feel more in control of themselves and their health.²⁹ The outcomes of a study on the use of tai chi, yoga, and qi gong in older adults measured decreases in pain intensity and increases in quality of life.³⁰

Christopher A. Brown & Anthony K. P. Jones³¹ propose that mindfulness-based CAM therapies do not need to reduce physical pain to improve emotional functioning. Mindfulness-based interventions impact pain's cognitive and emotional components by altering the patient's perception of their control over pain.³² Early intervention with CAM for pain may mitigate emotional and mental health symptoms and reduce pain-related disability. This research aims to start filling in the gaps left by few quality studies exploring the relationships between using CAM therapies for chronic pain and emotional and mental health.

Research Question and Hypothesis

When pain is relieved due to surgery, there are improvements in mental health.³³ However, in chronic pain, the pain may persist for an extended period or never be alleviated. Finding ways to manage the emotional and mental health impacts is crucial. This paper studies the relationships between CAM use for chronic pain and emotional health. The research question asks, what is the impact on emotional health for individuals receiving complementary and alternative therapies for chronic pain? It is hypothesized that using CAM therapies for chronic pain will improve emotional health.

Innovations & Implications

While the research on CAM therapies seems promising, there are limited studies on CAM, chronic pain, and mental health. While CAM encompasses a wide variety of therapies,

most studies on CAM use for mental health or pain focus on mindfulness and mindful movement-based therapies. Many CAM studies use an established body of evidence and warn of methodological issues such as inflated findings, small sample size, non-randomized studies, lack of adequate controls, underreporting of negative results, and overall poor-quality research.³⁴

This study used data from a multi-purpose health study established in 1957 with variables from a questionnaire that has undergone rigorous development and revision over ten years.³⁵ Past research on the impact of CAM therapies on pain and mental health has come from a medical perspective of pain treatment or a psychological view of mental health. This study is innovative in the researchers' biopsychosocial-spiritual, person-centered, person-in-environment social work perspective.

Methods

Dataset

The dataset for the current study comes from the Adult Complementary and Alternative Medicine file of the 2012 National Health Interview Survey (NHIS), obtained from the Inter-university Consortium for Political and Social Research.³⁶ The NHIS is a multi-purpose health survey conducted by the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC).³⁷ The NHIS has been conducted since 1957 and is the leading source of information on the health of the civilian noninstitutionalized population in the United States.

In 2002, 2007, and 2012, the NHIS added supplemental questions on complementary and alternative medicine.³⁸ These three surveys were sponsored primarily by the National Center for Complementary and Alternative Medicine (NCCAM), part of the National Institutes of Health, to develop nationally representative datasets on the out-of-pocket costs, prevalence, and reasons for

the use of CAM therapies.³⁹ Existing datasets at the time lacked large enough sample sizes; hence, the NHIS was chosen as the vehicle for the CAM survey due to the large sample size.⁴⁰

The variables from the dataset chosen for this study were:

1. TP1CND51, which identifies the respondents who used the first top therapy for chronic pain;
2. TP1_OUT4, which identifies respondents using or seeing a practitioner for their first top therapy led to feeling better emotionally.

Researchers chose this dataset because they believed that these variables could yield results in answering the research question: What is the impact on emotional health for individuals receiving complementary and alternative therapies for chronic pain?

Instrument

The instrument used to measure the selected variables in the 2012 NHIS was the Adult Complementary and Alternative Medicine Supplement (ACAMS). The data produced by the researchers' variables for the proposed study are nominal. While the 2012 NHIS included a supplement on CAM for children, the target population was adults aged 18 and over in the United States. Hence, the adult supplement was appropriate for this study. In designing the questions used on the ACAMS, the NCHS conducted literature reviews identifying previous surveys on CAM to determine which therapies to include in the survey and to develop questions about reasons for using complementary and alternative therapies, including specific wellness-related reasons.⁴¹ The 2002 and 2007 NHIS resulted in NCCAM receiving unsolicited feedback from CAM researchers and practitioners.⁴² This feedback and a workshop focusing on the relationship between wellness and CAM therapies informed modifications of previous questionnaire versions and the development of new questions.⁴³ An iterative process of cognitive

interviewing was used to determine how respondents interpreted questions and what they thought while answering them, helping to develop and refine questions.⁴⁴ The final step of survey development was approval by the NCHS Research Ethics Review Board.⁴⁵

Target Population

The target population for the study was adults eighteen and older in the United States who have used complementary and alternative therapies for chronic pain. The target population for the NHIS was households within the United States, including the District of Columbia.⁴⁶ Households were defined as civilians in noninstitutionalized settings such as permanent households, homeless shelters, rooming houses, and group homes.⁴⁷ The NCHS excluded individuals with no fixed household address, active duty military and civilians living on military bases, individuals in long-term care facilities, individuals in correctional facilities, and U.S. nationals residing outside the U.S. from the NHIS.⁴⁸

Sampling

The research study did not select participants or reconstruct the sampling frame from the NHIS 2012; therefore, it does not have its own sampling frame.⁴⁹ The NHIS sample design was a probability design that allowed for representative sampling of households and some non-institutional group housing across all fifty states and the District of Columbia, generally proportional to population size. Geographically clustered sampling techniques selected the sample housing units.⁵⁰ Data collection occurs continuously from January to December each year, so each month's sample was designed to be nationally representative.⁵¹ The total interviewed sample for the 2012 NHIS consisted of 42,366 households.⁵² The ACAMS questionnaire was administered to all sample adult participants, thus the sample size was 34,525.⁵³

Ethics

Standards set to protect the research participants guide ethical research. Researchers safeguard the rights of participants by obtaining informed consent, maintaining privacy and confidentiality, and not subjecting participants to harm.⁵⁴ Study participants must sign an informed consent form stating they voluntarily agree to participate. Researchers provide informed consent forms in the participants' language, briefly describing the research process, including risks to the participants.⁵⁵ The informed consent discusses how researchers will maintain confidentiality and advises participants that they may withdraw consent at any time without consequences.⁵⁶ The present study posed no known risks to the participants. Since researchers utilized secondary data from the NHIS, they could not access identifying information; therefore, they were unable to link participants to their responses.⁵⁷ Although the results of the NHIS data are available to the public, the NHIS prohibits releasing information that may compromise the confidentiality of the study participants.⁵⁸ The current study followed the same confidentiality guidelines.

Research Design

The present research study used a quantitative research design. Quantitative research establishes relationships between the variables by collecting and analyzing data from the sample population.⁵⁹ Moreover, quantitative research allows researchers to engage with participants objectively so that study results can be applied to the general population.⁶⁰ Analyzed secondary data collected using a cross-sectional survey with variables on the emotional health of participants using complementary and alternative therapies for chronic pain.

Statistical analysis via SPSS was used to establish whether a relationship existed between the variables.⁶¹ The experimental and quasi-experimental methods were inappropriate for the

researchers' purposes because they did not seek to establish causation. The experimental method requires the researcher to control the conditions and experiences of participants so that cause-and-effect can be inferred from the variables.⁶² The quasi-experimental method also aims to demonstrate causation between the intervention and outcomes.⁶³

Results

This study evaluated the relationship between those who use complementary and alternative medicine for chronic pain and emotional health. Researchers analyzed secondary data using data from the National Health Interview Survey's Adult Complementary and Alternative Medicine Supplement (ACAMS). The NHIS Sample Adult Questionnaire was administered to 34,525 participants. However, the ACAMS had a significant number of missing responses. Researchers used statistical tests in SPSS to examine the variables: used first top therapy for chronic pain (TP1CND51) and using or seeing a practitioner for first top therapy led to feeling better emotionally (TP1_OUT4). The study hypothesized that using CAM for chronic pain would lead to feeling better emotionally. Findings indicate a statistically significant relationship between using complementary and alternative medicine for chronic pain and improved emotional health.

Univariate Analysis

The frequency table for used first top therapy for chronic pain showed that 168 participants (3.8 percent of valid results) mentioned using their top therapy for chronic pain while 4309 participants (96.2 percent of valid results) did not. Of the participants who used CAM therapies for any reason, 4105 (41 percent of valid results) stated that using or seeing a practitioner for their first top therapy led to feeling better emotionally, while 5910 (59 percent of valid results) responded that it did not lead to feeling better emotionally.

Bivariate Analysis

A chi-square test of independence was performed to evaluate the relationship between using first top CAM therapy for chronic pain and using/seeing a practitioner for first top CAM therapy led to feeling better emotionally. Researchers used the chi-square test for independence to test the null hypothesis that these variables are independent or not related. The alternate hypothesis is the variables are dependent or related.

Table 1 displays the results of the cross-tabulation. More participants reported using/seeing a practitioner for chronic pain, which led to feeling better emotionally than those who did not report feeling better emotionally, a difference of 19 percent. Of the participants who reported using their first top therapy for chronic pain, 59.50 percent of those respondents also stated that using/seeing a practitioner for their first therapy led to feeling better emotionally. Of the people who used CAM therapies for reasons other than chronic pain, 36.70 percent felt better emotionally. The observed number of participants who used their first top therapy for chronic pain and felt better emotionally was more than expected.

As seen in Table 1, the chi-square test for independence results indicated a statistical significance between the two variables ($\chi^2_{(1)} = 36.04$; $p < .001$) at an alpha of .05. With $\alpha = .05$ and $df = 1$, the critical value was set at 3.84. The test statistic exceeds the critical value; therefore, researchers have rejected the null hypothesis. The results indicate that using CAM for chronic pain and feeling better emotionally are related. The phi coefficient, $\Phi = .09$, suggested a weak association between the variables (Table 1).

Table 1*Chi-square Analysis of Using CAM for Chronic Pain and its Impact on Emotional Well-being*

			Using/seeing a practitioner for first top therapy led to feeling better emotionally		χ^2	Φ	
			1 Yes	2 No			
Used first top therapy for chronic pain	1 Mentioned	Count	100	68	36.04	.09	
		Expected Count	63.0	105.0			
		percent within Used	59.5	40.5			
		first top therapy for chronic pain	percent	percent			
		percent within	6.0 percent	2.4 percent			
		Using/seeing a practitioner for first top therapy led to feeling better emotionally					
		percent of Total	2.2 percent	1.5 percent			
		2 Not mentioned	Count	1571	2714		
			Expected Count	1608.0	2677.0		
			percent within Used	36.7	63.3		
first top therapy for chronic pain	percent		percent				
percent within	94.0		97.6				
	Using/seeing a practitioner for first top therapy led to feeling better emotionally	percent	percent				
	percent of Total	35.3 percent	60.9 percent				

* $p < .001$ *Discussion*

The primary objective of this study was to determine whether individuals who use complementary and alternative medicine for chronic pain have an improvement in their emotional health. Statistical analyses supported the theory that CAM use for chronic pain leads

individuals to feel better emotionally, with 59.5 percent of those using CAM for chronic pain feeling better emotionally. While statistically significant, the effect size was weak ($\Phi = .09$), perhaps due to a low number of respondents using CAM for chronic pain or other study limitations.

Univariate analyses showed that only 3.8 percent of valid results mentioned using CAM for chronic pain. The fear-avoidance model of pain does not consider the physiological component of chronicity or predict disability.⁶⁴ However, there may be an aspect of fear of movement for those suffering from chronic pain, a concern that CAM therapies could make their pain worse, so they do not participate. Physicians with a biomedical perspective focusing on interventional procedures and medications to lessen chronic pain may be less likely to recommend CAM therapies for their patients, especially when previous studies have mixed results, many with severe methodological issues.⁶⁵ Patients coping with the mental and emotional impacts of chronic pain may seek a professional whose psychological approaches aim to improve mood by changing the way patients think and behave.⁶⁶ In the evidence-based fields of social work and psychology, practitioners may not feel comfortable suggesting CAM approaches to a patient without research-based evidence.⁶⁷

The present research revealed that of valid results, 41 percent of participants who use CAM for any reason reported improved emotional well-being. The bivariate analysis further indicated that over 59 percent of participants who use CAM for chronic pain experienced a similar improvement. These results underscore the role of CAM therapies in addressing the emotional aspects of chronic pain. Lee et al.⁶⁸ remind us that CAM therapies are person-centered approaches that consider the mind, body, and spirit while promoting the self-management of pain. CAM therapies based on gentle movement decrease pain intensity and increase quality of

life.⁶⁹ Hooten (2016) states that rates of depression increase as chronic pain becomes more severe. A person living with chronic pain would likely feel better emotionally with their pain reduced and quality of life improved from their participation in CAM. Brown & Jones⁷⁰ state that mindfulness-based CAM therapies do not need to lower levels of physical pain to enhance emotional health; instead, they impact the control patients perceive they have over their pain. This perceived control over persistent pain may be a factor in why emotional well-being is improved more in CAM therapy use for chronic pain than in CAM use for other reasons coded into the variables for top reasons for using CAM, such as asthma, high cholesterol, fatigue, fever, senility, coronary heart disease, sinusitis, skin issues, and insomnia.

The researchers' social work perspective of chronic pain and emotional health includes a biopsychosocial-spiritual, person-centered, person-in-environment approach. While CAM therapies may lead individuals to feel more control over their pain or decrease pain intensity, these changes may not be significant enough to improve emotional health.⁷¹ The complex social aspects of chronic pain include lower levels of employment, decreased socioeconomic status, and relationship difficulties that accompany substantially restricted activities.⁷² Such social implications may overpower the impacts of CAM therapies, thus not leading some individuals to feel better emotionally.

Wahbah et al.⁷³ explain how each CAM modality has varying impacts on differing chronic pain conditions, though they warn of the methodological limitations of the studies used for their research. The CAM modalities' effectiveness for each participant in the study may have impacted the number of people who felt better emotionally due to their therapy. Researchers did not determine which CAM therapies respondents used for various types of chronic pain as it was beyond the scope of the current study. Previous research suggested CAM therapies should be

included in treatments soon after the onset of significant pain to address the bidirectional nature of pain intensity and mental health.⁷⁴ However, more quality research is needed to study which CAM therapies are more effective for different forms or causes of chronic pain and the associated impacts on emotional well-being.

Strengths

Using secondary data provides several strengths for this research study. Secondary data often contain larger sample sizes and implement more rigorous research procedures than a student project has the time and resources to afford.⁷⁵ The 2012 NHIS sample comprised 42,366 households, yielding 34,525 adult respondents to the ACAMS questions.⁷⁶ The ACAMS' large sample size and rigorous development of questions and variables over several years may increase reliability. The time, personnel, and monetary cost of such steps are beyond the scope of a student project.

Limitations

The relationship between CAM use for chronic pain and emotional health was statistically significant. However, the effect size was weak with $\phi = .09$. This is likely due to only 3.8 percent of valid results mentioning chronic pain as the primary reason for using CAM. Future studies can utilize a larger sample of participants who use CAM for chronic pain, thus having a higher number of valid answers and the potential to increase effect size.

The most significant challenge to using the 2012 NHIS secondary dataset was the inability to design a questionnaire explicitly developed to answer the research question.⁷⁷ Researchers using primary data intend their collection methods to address the theoretical constructs relevant to the research problem and answer the research question (Hox & Boeijs, 2005). Using a secondary data set limited the research design to a strictly quantitative

methodology, which excluded using a mixed method or integrative design to gain the benefits of the qualitative methodology.⁷⁸ A process incorporating qualitative principles could include semi-structured interviews, intensive interviewing, or focus groups to collect participants' voices in their own words.⁷⁹ Participants would discuss the outcomes and meanings they attach to using CAM therapies for chronic pain rather than a limited list of answers.⁸⁰

Conclusion

This study delivered a social work person-centered, biopsychosocial-spiritual perspective of CAM approaches to treating pain and the associated emotional and mental issues. The statistically significant relationship between CAM use for chronic pain and emotional health demonstrated in this study can lead researchers to study these variables in depth. Future researchers may use methodological designs to establish causality, further developing the base of evidence to support social workers' use and recommendation of CAM therapies for clients with chronic pain and issues with mental and emotional health.

Policy social workers use research evidence to approach health policy with a perspective on the social environment and relationships.⁸¹ They can use the results of the study to support policies that help people access affordable care. One such policy could mandate that health insurance companies, Medicare, and Medicaid cover complementary and alternative treatments to help manage chronic pain and mental health.

Healthcare social workers in integrated healthcare and interdisciplinary healthcare teams coordinate with other providers to support patients accessing medical and behavioral healthcare in a multi-faceted approach.⁸² With statistically significant research, social workers can bring complementary and alternative treatments into integrated and interdisciplinary approaches. Clinical social workers bring evidence-based practice into their care of clients.⁸³ The evidence

from this research and the future studies it inspires will secure clinical social workers in their decision to provide or recommend complementary and alternative therapies for the emotional health of their clients with chronic pain.

ENDNOTES

¹ S. Michaela Rikard, et al. “Chronic Pain Among Adults — United States, 2019–2021.” *Morbidity and Mortality Weekly Report* 72, no. 15 (2023), <http://dx.doi.org/10.15585/mmwr.mm7215a1>.

² Jennifer S. De La Rosa, et al., “Co-occurrence of Chronic Pain and Anxiety/Depression Symptoms in U.S. Adults: Prevalence, Functional Impacts, and Opportunities, *Pain (Amsterdam)* 165, no. 3 (2024), <https://doi.org/10.1097/j.pain.0000000000003056>

³ Kristin Krohn Garnæs et al., “Mental Health Among Patients with Chronic Musculoskeletal Pain and its Relation to Number of Pain Sites and Pain Intensity, A Cross-Sectional Study Among Primary Health Care Patients,” *BMC Musculoskeletal Disorders*, 2, no. 1 (2022), <https://doi.org/10.1186/s12891-022-06051-9>

⁴ “Chronic Pain,” Johns Hopkins Medicine, updated January 18, 2024, <https://www.hopkinsmedicine.org/health/conditions-and-diseases/chronic-pain>

⁵ “Complementary Medicine,” Cleveland Clinic, updated September 15, 2021, <https://my.clevelandclinic.org/health/articles/16883-complementary-therapy>.

⁶ Amy S. Hamlin and T. Michelle Robertson, “Pain and Complementary Therapies,” *Critical Care Nursing Clinics of North America* 29, no. 4 (2017), <https://doi.org/10.1016/j.cnc.2017.08.005>; S. Khady Ndao-Brumlay, S. and Carmen R. Green, “Predictors of Complementary and Alternative Medicine Use in Chronic Pain Patients.” *Pain Medicine*, 11, no. 1 (2010), <https://doi.org/10.1111/j.1526-4637.2009.00767.x>.

⁷ Marloes MJG Gerrits et al., “Pain, Not Chronic Disease, is Associated with the Recurrence of Depressive and Anxiety Disorders, *BMC Psychiatry* 14, no. 187 (2014), <https://doi.org/10.1186/1471-244X-14-187>.

⁸ Javid Majlesi, “Patients with Chronic Musculoskeletal Pain of 3–6-Month Duration Already Have Low Levels of Health-Related Quality of Life and Physical Activity, *Current Pain and Headache Reports*, 23, no. 11 (2019). <https://doi.org/10.1007/s11916-019-0817-6>.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² W. Michael Hooten, “Chronic Pain and Mental Health Disorders: Shared Neural Mechanisms, Epidemiology, and Treatment,” *Mayo Clinic Proceedings*, 91, no. 7 (2016), <https://doi.org/10.1016/j.mayocp.2016.04.029>.

¹³ Ibid.

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- ¹⁴ Veronica Martínez-Borba et al., “Predicting the Physical and Mental Health Status of Individuals with Chronic Musculoskeletal Pain from a Biopsychosocial Perspective: A Multivariate Approach.” *The Clinical Journal of Pain* 37, no. 3 (2021), <https://doi.org/10.1097/AJP.0000000000000913>.
- ¹⁵ Rikard et al., “Chronic Pain Among,”
- ¹⁶ Ibid.
- ¹⁷ “NIH Study Finds High Rates of Persistent Chronic Pain Among U.S. Adults.” National Institutes of Health. Updated December 4, 2023.
- ¹⁸ “The Financial and Emotional Cost of Chronic Pain,” U.S. Pain Foundation, updated June 5, 2023, <https://uspainfoundation.org/news/the-financial-and-emotional-cost-of-chronic-pain/>.
- ¹⁹ Victoria A. Grunberg et al., “Mechanisms of Change in Depression and Anxiety Within a Mind-Body Activity Intervention for Chronic Pain,” *Journal of Affective Disorders* 292 (2021), <https://doi.org/10.1016/j.jad.2021.05.069>.
- ²⁰ Grunberg et al., “Mechanisms of Change.”
- ²¹ Nicholas, Michael K, “The Biopsychosocial Model of Pain 40 Years On: Time for a Reappraisal? *Pain (Amsterdam)* 163, no. S1 (2022), <https://doi.org/10.1097/j.pain.0000000000002654>.
- ²² Ibid.
- ²³ Ibid.
- ²⁴ an W. S. Vlaeyen et al., “The Fear-Avoidance Model of Pain. *Pain (Amsterdam)* 157, no. 8 (2016), <https://doi.org/10.1097/j.pain.0000000000000574>.
- ²⁵ Crombez, Geert et al., “Fear-Avoidance Model of Chronic Pain: The Next Generation,” *The Clinical Journal of Pain*, 28, no. 6 (2012), <https://doi.org/10.1097/AJP.0b013e3182385392>.
- ²⁶ Timothy H. Wideman et al., “Rethinking the Fear Avoidance Model: Toward a Multidimensional Framework of Pain-Related Disability. *Pain (Amsterdam)* 154, no.11 (2013), <https://doi.org/10.1016/j.pain.2013.06.005>.
- ²⁷ Courtney Lee et al., “Mind–Body Therapies for the Self-Management of Chronic Pain Symptoms.” *Pain Medicine* 15, no. S1 (2014), <https://doi.org/10.1111/pme.12383>
- ²⁸ Helané Wahbeh et al., “Mind-Body Interventions: Applications in Neurology.” *Neurology* 70, no. 24 (2008), <https://doi.org/10.1212/01.wnl.0000314667.16386.5e>
- ²⁹ Inger Burnett-Ziegler et al., “Acceptability of a Mindfulness Intervention for Depressive Symptoms Among African-American Women in a Community Health Center: A Qualitative Study,” *Complementary Therapies in Medicine*, 45 (2019), <https://doi.org/10.1016/j.ctim.2019.05.012>.
- ³⁰ Quality of Life in Middle-Aged and Old People with Chronic Pain? A Systematic Review and Meta-analysis.” *Frontiers in Aging Neuroscience* 14 (2022), <https://doi.org/10.3389/fnagi.2022.921069>.
- ³¹ Teri Browne, “Social Work Roles in Healthcare Settings,” in *Handbook of Health Social Work*, 3rd ed. ed., Sarah Gehlert and Teri Browne (Jossey-Bass, 2019), chap. 2.
- ³² Ibid.
- ³³ Meghan K. Wally et al., “Musculoskeletal Pain Management and Patient Mental Health and Well-Being. *Journal of Orthopaedic Trauma* 36. No. Suppl 5 (2022), <https://doi.org/10.1097/BOT.0000000000002457>.
- ³⁴ Courtney Lee et al., “Mind–Body Therapies.”; Jessica Pieczynski, et al., “Mind-Body Interventions for Rehabilitation Medicine: Promoting Wellness, Healing, and Coping with Adversity. *Physical Medicine and Rehabilitation Clinics of North America* 31, no. 4 (2020),

<https://doi.org/10.1016/j.pmr.2020.07.008>; Helané Wahbeh et al., “Mind-Body Interventions: Applications in Neurology.” *Neurology* 70, no. 24 (2008), <https://doi.org/10.1212/01.wnl.0000314667.16386.5e>

³⁵ “National Health Interview Survey (NHIS),” Office of Disease Prevention and Health Promotion, updated November 30, 2023, <https://health.gov/healthypeople/objectives-and-data/data-sources-and-methods/data-sources/national-health-interview-survey-nhis>; Barbara J. Stussman et al., “Development of the Adult and Child Complementary Medicine Questionnaires Fielded on the National Health Interview Survey.” *BMC Complementary and Alternative Medicine* 13, no.1 (2013), <https://doi.org/10.1186/1472-6882-13-328>.

³⁶ Data for *National Health Interview Study, 2012 Sample Adult: Adult Complementary and Alternative Medicine Supplement*. (ICPSR36146.v1) ICPSR, accessed October 11, 2023, <https://doi.org/10.3886/ICPSR36146.v1>.

³⁷ *2012 National Health Interview Survey, Public Use Data Release: NHIS Survey Description* (National Center for Health Statistics, Centers for Disease Control and Prevention, 2013). https://ftp.cdc.gov/pub/health_statistics/nchs/dataset_documentation/NHIS/2012/srvydesc.pdf.

³⁸ Barbara J. Stussman et al., “Development of the Adult.”

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Ibid.

⁴⁶ *2012 National Health Interview Survey, Public Use Data Release: NHIS Survey Description* (National Center for Health Statistics, Centers for Disease Control and Prevention, 2013). https://ftp.cdc.gov/pub/health_statistics/nchs/dataset_documentation/NHIS/2012/srvydesc.pdf.

⁴⁷ National Center for Health Statistics, “About the National.”

⁴⁸ Ibid.

⁴⁹ Stephen J. Mooney and Michael D. Garber. “Sampling and Sampling Frames in Big Data Epidemiology,” *Current Epidemiology Reports*, 6, no. 1 (2019), <https://doi.org/10.1007/s40471-019-0179-y>.

⁵⁰ National Center for Health Statistics, “About the National.”

⁵¹ Ibid.

⁵² Ibid.

⁵³ Ibid.

⁵⁴ Rafael J. Engel and Russell K. Shutt. *The Practice of Research in Social Work*, 4th ed. (Sage Publications, 2017).

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Parsons et al., 2014.

⁵⁹ Craig A. Mertler, *Introduction to Educational Research*. (Sage, 2016).

⁶⁰ Ibid.

⁶¹ Gregory J. Privitera, *Statistics for the Behavioral Sciences*. 10th ed. (Sage Publications, 2017).

⁶² Ibid.

⁶³ Harris et al., 2006.

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- ⁶⁴ Timothy H. Wideman et al., “Rethinking the Fear.”
- ⁶⁵ Courtney Lee et al., “Mind–Body Therapies.”; Jessica Pieczynski, et al., “Mind-Body Interventions.”; Helané Wahbeh et al., “Mind-Body Interventions.”
- ⁶⁶ Nicholas, “The Biopsychosocial Model.”
- ⁶⁷ Dean H. Hepworth, Ronald H. Rooney, Glenda Dewberry Rooney, and Kimberly, Strom-Gottfried, *Direct Social Work Practice: Theory and Skills*, 10th ed. (Cengage, 2017).
- ⁶⁸ Courtney Lee et al., “Mind–Body Therapies.”
- ⁶⁹ Yu-Rong Wen et al. “Are Mind-Body.”
- ⁷⁰ Teri Browne, “Social Work Roles.”
- ⁷¹ Inger Burnett-Ziegler et al., “Acceptability of.”; Yu-Rong Wen et al. “Are Mind-Body.”
- ⁷² Majlesi, “Patients with Chronic.”; Rikard et al., “Chronic Pain Among,”
- ⁷³ Helané Wahbeh et al., “Mind-Body Interventions.”
- ⁷⁴ Meghan K. Wally et al., “Musculoskeletal Pain.
- ⁷⁵ Engel and Schutt. *The Practice of Research*.
- ⁷⁶ National Center for Health Statistics, “About the National.”
- ⁷⁷ Engel and Schutt. *The Practice of Research*.
- ⁷⁸ Ibid.
- ⁷⁹ Engel and Schutt. *The Practice of Research.*; Looi Theam Choy, “The Strengths and Weaknesses of Research Methodology: Comparison and Complimentary Between Qualitative and Quantitative Approaches,” *IOSR Journal of Humanities and Social Science* 19, no. 4 (2014), <https://iosrjournals.org/iosr-jhss/papers/Vol19-issue4/Version-3/N0194399104.pdf>.
- ⁸⁰ Engel and Schutt. *The Practice of Research*.
- ⁸¹ Daniel P. Miller et al., “A Social Work Approach to Policy: Implications for Population Health. *American Journal of Public Health* 107, no. S3 (2017), <https://doi.org/10.2105/AJPH.2017.304003>.
- ⁸² Teri Browne, “Social Work Roles.”; Gail Steketee et al., “Health Outcomes and Costs of Social Work Services: A Systematic Review. *American Journal of Public Health* 107, no. S3 (2017), <https://doi.org/10.2105/AJPH.2017.304004>.
- ⁸³ Dean H. Hepworth et al., *Direct Social Work*.