

REVIEW ARTICLE

PAIN MANAGEMENT

The relationship between chronic musculoskeletal pain and depression

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ABSTRACT

One of the main causes of disability in the world, chronic musculoskeletal pain (CMP) is frequently linked to psychiatric conditions, especially depression. A growing body of research suggests that there is a complex and reciprocal link between CMP and depression. Persistent pain, diminished functional ability, and a lower quality of life are all ways that CMP can lead to the emergence of depressive symptoms. On the other hand, depression can worsen pain perception through psychological and neurological processes. According to recent epidemiological research, 20–40% of people with chronic pain also have depression. This emphasizes how crucial it is to use integrated management techniques that deal with the condition's psychological and physical components. This study addresses musculoskeletal pain and depression because it is crucial to comprehend this relationship in order to improve therapeutic outcomes and lessen the burden of chronic musculoskeletal illnesses.

Keywords: depression, mental health, biopsychosocial model, chronic pain, musculoskeletal pain

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1. INTRODUCTION

Globally, people are living longer than they did in the past. By 2050, there will be 1.5 billion people worldwide who are 65 years of age or older, up from 10% in 2022 to 16%. In the meantime, it is anticipated that between 2020 and 2050, the number of adults 80 years of age and above would treble to 426 million. However, longer life expectancy brought about by medical advancements does not always equate to healthier years. Disability, a higher chance of developing chronic illnesses, and a deterioration in quality of life are frequently associated with longer lifespans. These issues put a great deal of financial and psychological strain on patients as well as the finances of the healthcare system. Musculoskeletal disorders (MSDs) are one chronic illness that has a major influence on daily functioning and general well-being in older persons¹.

Symptoms of MSDs include pain, restricted movement, decreased flexibility, impaired general function, and diminished job capability². MSDs have significant clinical ramifications that impact mobility, productivity, and general quality of life². The most frequent reason people seek medical or alternative therapy is pain³⁻⁸. Depression and chronic musculoskeletal pain (CMP) often coexist (as a comorbidity)⁹. Both depression and CMP are serious global public health issues and the world's leading causes of disability^{2, 10-13}.

Depression and physical pain frequently coincide. individuals with chronic pain frequently have symptoms of anxiety and/or depression, while individuals with anxiety and/or depression frequently experience chronic pain¹⁴. In therapeutic practice, this coexistence presents serious difficulties. These two situations are not just coincidentally related; rather, they are the result of intricate interplay between biological, psychological, and social elements¹.

Worsening maladaptive cognitive patterns, decreased treatment adherence, increased medication use, increased functional limitations, decreased self-confidence, increased social isolation, loss of work capacity, poorer outcomes, and an increased risk of suicide are some of the mutually reinforcing effects of their coexistence^{14, 15}.

Therefore, to increase diagnostic precision and create successful therapy approaches to avoid impairment, a thorough understanding of the connection between CMP and depression is crucial¹⁶. The definitions, epidemiology, pathophysiology, and management of musculoskeletal pain and depression will all be covered in this essay.

1.1. Definition of Chronic Musculoskeletal Pain and Depression

The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience that is either characterized in terms of actual or potential tissue damage^{6, 17–21}. Conditions affecting the bones, muscles, joints, and connective tissues are referred to as musculoskeletal disorders (MSDs). MSDs have a wide range of etiologies, including age-related degeneration, autoimmune illnesses, overuse injuries, and hereditary predisposition². Gout, neck pain, and low back pain are additional factors²². Anxiety and sadness affect about 40% of individuals with persistent musculoskeletal pain, which is a sign of MSDs¹³.

Anhedonia, feelings of worthlessness, difficulties concentrating, sleep disorders, and suicidal thoughts are some of the symptoms of depression^{23, 24}. Depression is diagnosed using validated clinical scales, such as the Diagnostic and Statistical Manual of Mental Disorders (DSM). One proven method for identifying and diagnosing depression is the Patient Health Questionnaire-8 (PHQ-8). The PHQ-8 uses a summed scoring system to categorize symptoms as follows: none/minimal (0–4), mild (5–9), moderate (10–14), and severe (15–24). The conventional cutoff threshold for probable depression is a PHQ-8 score of 10 or above¹⁴.

1.2. Epidemiology of Chronic Musculoskeletal Pain and Depression

Musculoskeletal disorders (MSDs) afflict over 1.71 billion people globally, according to data from the

Global Burden of Disease 2019¹. MSDs have a high incidence and disability load. MSDs are responsible for 6.7% of disability-adjusted life years (DALYs) worldwide, rising to 21.3% in high-income nations, according to the Global Burden of Disease (GBD) research. Eighty percent of disabilities in 2017 were caused by non-communicable diseases, with certain ailments including neck pain (18.4%), osteoarthritis (19.3%), and low back pain (36.8%) being quite common globally, exerting a heavy load on public health systems. Over 1.63 billion persons worldwide suffered from MSDs by 2020, making them the second most common cause of non-fatal disability²².

About 37% of Americans suffer from chronic musculoskeletal pain (CMP), which has an estimated annual economic cost of \$635 billion. The European Union has reported similar numbers. The frequency of CMP in elderly persons varies from 18.6% in Switzerland to 45.6% in France. In an Italian multicenter research, CMP was identified in 45% of 1,606 patients who were referred to pain clinics for non-oncological chronic pain management¹⁵.

CMP affects between 20 and 30 percent of working adults, and this percentage is still rising¹². According to epidemiological research, almost one-fifth of people in the US and Europe have chronic pain^{11, 24}. Chronic pain affects about 30.7% of adults in the US, 17.1% of adult men, and 20% of adult women in Australia²⁴. The prevalence of chronic pain varies between 11% and 40%, with the U.S. Centers for Disease Control and Prevention estimating a point prevalence of 20.4%. A systematic review in the United Kingdom reported a prevalence of 43.5%, with moderate to severe pain ranging from 10.4% to 14.3%. A study evaluating chronic pain among homeless populations found prevalence rates between 47% and 63%. A large-scale longitudinal study over four years in the United Kingdom reported an annual incidence of chronic pain of 8.3%, with a recovery rate of 5.4%⁶. Depression is often the result of chronic pain. Major depression affects up to 85% of individuals with chronic pain, and major depression influences up to 85% of cases of chronic pain^{10, 11}.

An estimated 5% of young adults suffer from depression, making it one of the most prevalent mental health conditions²³. Behavioral disorders, anxiety, and depression are commonly seen in younger groups²⁵. According to a recent meta-analysis, anxiety and sadness affect almost 40% of people with chronic pain¹³. Chronic pain-related depression, such that experienced by cancer patients, is frequently connected with worse health and a lower quality of life²⁶.

Older adults frequently experience pain and depressed symptoms, which are linked to unfavorable outcomes like impairment¹⁶. CMP affects about 20–30% of working adults, and its incidence is still rising¹². Over 50% of older persons have CMP, and almost half of those who have it report having discomfort at several different locations¹⁶.

1.3. Pathophysiology of Chronic Musculoskeletal Pain and Depression

The pathogenic mechanisms of musculoskeletal pain are related to differences in the sensory innervation of bones, joints, and muscles compared to the skin, involving various cells and mediators of both the peripheral and central nervous systems. Interactions between neurons and non-neuronal cells (e.g., glial, mesenchymal, and immune cells) amplify and increase the sensitivity of pain signals, leading to structural remodeling of the cortex. Furthermore, how musculoskeletal pain manifests, is felt, and is assessed depends on a variety of factors, including sex, age, mood, social influences, beliefs, thoughts, and pain-related behaviors¹⁵.

In recent decades, research on depression has increased significantly²³. According to research, biological, psychological, and social factors—such as female sex, low socioeconomic status, problems in relationships with parents or peers, sleep disturbances, and traumatic experiences—are risk factors for the emergence of stress and mental disorders in adolescents²⁵.

The onset and persistence of primary musculoskeletal pain and associated impairment are significantly influenced by depressed mood, a propensity for somatization, and negative health views. Pain, cognition, and emotional state interact in a complicated way. Emotions, focus, and memory can all be adversely affected by chronic pain. On the other hand, feelings and thought processes can either increase or decrease the experience of pain. While optimistic expectations of pain reduction are a key component of placebo analgesia, negative treatment expectations reduce the analgesic effects of medications¹⁵.

Anxiety, depression, and pain are clearly related pathophysiologically¹⁰. Chronic pain is closely associated with depression in a bidirectional manner in terms of onset, progression, and mutual exacerbation of severity^{3, 10, 11, 27, 28}. This relationship is complex and involves multiple biological, psychological, and social mechanisms. Chronic musculoskeletal pain increases

the risk of depression, while depression can worsen pain perception and reduce patients' functional capacity²³.

Psychosocial factors of employment, including job discontent, work-related stress, and boredom, are also linked to musculoskeletal discomfort. Pain experience and chronicity are influenced by education level and socioeconomic status, especially in musculoskeletal disorders. For example, individuals with lower education levels and those living in disadvantaged areas have a higher risk of increased pain and disability associated with knee osteoarthritis¹⁵.

Gene expression in chronic musculoskeletal pain is also influenced by psychosocial variables. For example, increasing expression of brain-derived neurotrophic factor (BDNF) may be connected to a higher risk of central sensitization and is linked to greater biopsychosocial complexity. Different microRNA segments are more highly expressed in neuropathic musculoskeletal pain than in nociceptive pain, according to other research¹⁵.

1.4. Classification of Chronic Musculoskeletal Pain

1.4.1. Based on Duration

Musculoskeletal pain can be classified into acute and chronic types based on duration⁵. According to the International Association for the Study of Pain, chronic pain is defined as intermittent or persistent pain that continues or recurs beyond the normal healing time of tissues (more than 3 months)^{7, 9, 11–13}. Chronic pain commonly affects young adults and causes disability in approximately 21% of this population^{13, 29}.

1.4.2. Based on Mechanism

Nociceptive and neuropathic pain are two types of pain based on their underlying processes¹⁰. Three types of chronic pain are identified in other literature: nociceptive, neuropathic, and nociplastic pain.

a. Nociceptive Pain

The most prevalent type of chronic pain is nociceptive pain. It is caused by brain pathways being activated in reaction to real or potentially harmful stimuli. Arthritis and the majority of spinal pain kinds are two examples⁶. Nociceptive pain is frequently brought on by cancer, trauma, autoimmune diseases, infection, and aging³⁰.

b. Neuropathic Pain

The International Association for the Study of Pain defines neuropathic pain as pain brought on by illness, malfunction, injury, or lesions in the somatosensory system, either in the central or peripheral nerve systems^{31–36}.

There are two types of neuropathic pain: peripheral and central. Toxic exposure (such as chemotherapy-induced neuropathy), metabolic disorders (such as diabetic polyneuropathy), trauma, infections (such as HIV-related neuropathy, postherpetic neuralgia), compression (such as tumors, trigeminal neuralgia), ischemia, nutritional deficiencies (such as vitamin B12 deficiency), and degenerative conditions can all cause peripheral neuropathic pain. Conditions like stroke, multiple sclerosis, spinal cord injury, traumatic brain injury, epilepsy, abscesses, Parkinson's disease, and syringomyelia can cause central neuropathic pain^{32,35,37–45}.

c. Nociceptive Pain

Nociceptive pain is characterized as pain resulting from altered nociception in the absence of obvious signs of somatosensory system dysfunction or current or potential tissue injury. Fibromyalgia, low back pain, irritable bowel syndrome, complex regional pain syndrome (CRPS), temporomandibular disorders, and headaches are among the illnesses that are frequently linked to it^{6,13,21}.

People with nociceptive pain had the highest prevalence of anxiety and depression symptoms. For instance, 55.5% of fibromyalgia patients have anxiety symptoms and 54.0% have depressed symptoms. On the other hand, people with neuropathic or nociceptive pain, like arthritis, have lower rates of anxiety (17.5–26.3%) and depression (22.1–29.1%)¹³.

2. Impact of Chronic Musculoskeletal Pain and Depression

2.1. Impact of Chronic Musculoskeletal Pain

Musculoskeletal pain may occur at a single site but more commonly affects multiple sites¹². It is the leading cause of disability worldwide and the most common reason for seeking healthcare¹². Musculoskeletal diseases are linked to frailty, depression, cognitive impairment, falls, poor sleep quality, and increased social isolation in older persons. These conditions have a significant impact on health, well-being, and quality of life¹.

Anxiety, depression, and mood problems are common in patients with chronic musculoskeletal pain²⁰. They often also experience disability, physical inactivity, sedentary behavior, pain-related malnutrition, and limitations in daily activities (e.g., walking, climbing stairs, performing daily tasks, and maintaining posture)^{1,46–53}. Mortality risk is increased by poor mental health and a lower health-related quality of life (HRQoL)²⁶.

Prolonged musculoskeletal pain can impact the results of rehabilitation and is linked to substantial mental health consequences¹². The risk of mental disorders such as depression, anxiety, fatigue, and insomnia is higher among individuals with chronic pain. According to a meta-analysis of 347,468 people, depression symptoms were present in 39.3% of young adults with chronic pain¹³.

2.2. Impact of Depression

Depression is a debilitating condition that negatively affects educational attainment, work performance, and other aspects of life. It can start early in childhood and raises the chance of substance abuse, chronic illnesses (including cardiovascular disease), and early death if left untreated²³. The World Health Organization states that depression is the primary global cause of disability²³.

2.3. Combined Impact of Chronic Pain and Depression

There are significant clinical ramifications when depression and chronic musculoskeletal pain coexist. The prognosis is worse for those with depression brought on by chronic pain than for those with chronic pain alone¹¹. Social dysfunction and sleep difficulties are frequent characteristics of both disorders⁶. Stress and depression are examples of psychological issues that might affect health through immunological alterations⁵⁴.

People who suffer from both depression and chronic pain may feel invalidated by friends, family, coworkers, and medical professionals. Social stigma and exclusion further reduce resilience and functional capacity. Both conditions are associated with negative outcomes, including substance abuse, social isolation, and increased suicide risk¹⁴.

4. Management of Chronic Musculoskeletal Pain and Depression

Management requires a holistic and multidisciplinary approach.

4.1. General Management (Multidisciplinary)

Treatment should be multidisciplinary, multimodal, and integrative. A biopsychosocial approach with personalized care and shared decision-making is recommended. Lifestyle interventions include weight management, exercise, proper nutrition, adequate sleep, smoking cessation, and ergonomic adjustments⁶.

4.2. Pharmacological Management

Pharmacotherapy includes antidepressants such as SSRIs, TCAs, and SNRIs. Duloxetine (60 mg) has proven effectiveness in treating chronic pain. Other treatments include opioids, non-opioid analgesics, anti-inflammatory drugs, and disease-modifying agents^{2, 6, 29}.

4.3. Non-Pharmacological Management

Non-pharmacological interventions include physiotherapy, structured exercise, and psychological therapies such as cognitive behavioral therapy (CBT). CBT is effective for both chronic pain and depression²³.

4.4. Surgical Management

Surgical interventions, such as joint replacement, are reserved for severe cases that do not respond to conservative treatment².

4.5. Emerging Therapies

Innovations such as virtual reality, telemedicine, and digital therapy offer new approaches for pain management and functional recovery².

5. CONCLUSION

Chronic musculoskeletal pain and depression are closely related conditions with a complex, bidirectional relationship. Chronic pain increases the risk of depression, while depression exacerbates pain perception and reduces functional capacity. Both conditions have high prevalence and significantly impact quality of life. Effective management requires a comprehensive, multidisciplinary, and biopsychosocial approach tailored to individual patient needs.

6. Authors contribution

1. ANFA: concept, literature search, drafting manuscript,
2. HBH: manuscript editing, manuscript validation, conducting of the study work

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