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Chronic Pain Management

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Abstract:

Chronic pain is a complex medical condition that affects millions of people worldwide. Unlike acute pain, which serves as a protective mechanism, chronic pain persists for extended periods, often beyond the time needed for tissue healing. Managing chronic pain is a multifaceted challenge that requires a comprehensive approach. This article provides an in-depth examination of chronic pain management, encompassing various treatment modalities, analgesic medications, adjuvant therapies, and the role of psychological and social factors in addressing this widespread health concern.[1].

Introduction:

Understanding Chronic Pain

- **Definition and Prevalence**

Chronic pain is a persistent condition characterized by ongoing discomfort that last for at least 12 weeks or beyond the typical recovery period. It may result from numerous factors, including undiagnosed illnesses, wounds, or even mysterious origins. 20% of American adults, or a sizeable portion of the adult population, report having chronic pain, according to data from the American Academy of Pain Medicine.[2]

- **Types of Chronic Pain**

Each form of chronic pain demands a unique management strategy and comes in a variety of shapes and sizes. For example, neuropathic pain is caused by damaged or dysfunctional nerves, whereas nociceptive pain is caused by tissue injury. Concentrated pain also has an effect on the central nervous system. It is critical to acknowledge these distinctions when establishing treatment strategies targeted to the many forms of chronic pain that patients experience.[3]

Multidisciplinary Pain Management

- ***The Multidimensional Nature of Chronic Pain***

Chronic pain is more than a physical condition. It is greatly influenced by psychological and cultural difficulties such as stress, anxiety, melancholy, and insomnia. The well-known neuromatrix concept highlights the intricate interplay of emotions and cognition in the pain experience. This concept emphasizes the importance of complete treatment programs that address not just the physical aspects of pain but also its psychological and emotional components.[4]

- ***The Role of Multidisciplinary Teams***

To manage the difficulties of chronic pain, several healthcare specialists must collaborate in a coordinated manner. This multidisciplinary approach to pain management recognizes the intricate interplay of biological, psychological, and social factors. A multidisciplinary team may include medical experts, psychiatrists, specialized nurses, physiotherapists, and occupational therapists who work together to address the complex issues behind chronic pain and provide comprehensive care to people who suffer from it.[5]

Analgesic Medication for Pain

Oral analgesics are the first line of pain treatment, following the WHO's analgesic ladder. This ladder suggests gradually increasing oral analgesic dosage and strength until pain relief is obtained. Opioids barely relieve 30% of chronic non-cancer pain due to dose-limiting adverse effects, despite 80-90% success rates in cancer patients.[6]

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

Non-opioid analgesics like paracetamol and NSAIDs are offered first. NSAIDs inhibit COX-1 and COX-2. COX-1 protects the digestive system and is present in numerous tissues, however COX-2 promotes inflammation and discomfort. Non-selective NSAIDs like aspirin and ibuprofen can cause stomach ulcers by targeting COX-1 and COX-2. Coxibs, selective COX-2 inhibitors, were created to lessen adverse effects but connected to cardiovascular issues. Non-selective NSAIDs, especially long-term, high-dose treatment, increase cardiovascular risk. Although naproxen seems safer, care is suggested. The European Medicines Agency advises heart disease and stroke patients to avoid coxibs and use non-selective NSAIDs cautiously based on risk factors. To reduce long-term cardiac, gastrointestinal, and renal hazards, high NSAID dosages should spur alternate therapy.[7]

Weak and Strong Opioids

At the second rung of the analgesic ladder, weak opioids like codeine and dihydrocodeine activate central nervous system opioid receptors to suppress pain signals. Long-term codeine usage increases cardiovascular risk, especially in the elderly. The third phase uses stronger opioids, which work better but have more adverse effects. These opioid receptor-activating medications produce drowsiness, respiratory depression, nausea, and hormonal changes by suppressing neuronal activity. Even though quick opioid tolerance development requires dosage increases, individuals reach maximal doses owing to adverse effects. Due to opioid tolerance and opioid-induced pain sensitivity, opioids can temporarily relieve musculoskeletal and neuropathic pain but not permanently. Dosing and withdrawal require prudence. In the absence of solid proof, opioid usage may worsen fibromyalgia symptoms.[8]

Topical Analgesics

Lipophilic opioids like fentanyl and buprenorphine can be given transdermally for pain treatment due to their quick skin absorption and bloodstream penetration. Compared to sustained-

release oral morphine, fentanyl patches had less adverse effects for non-cancer pain. Meanwhile, buprenorphine has been shown to treat some pain conditions with fewer side effects than oral morphine. Lidocaine relieves peripheral neuropathic pain locally with low side effects due to its limited skin absorption. Although some trials have indicated its efficacy, current Cochrane reviews have found insufficient evidence to support its usage.[9]

Adjuvants in Pain Management

Pain treatment requires adjuvant drugs for anxiety and fear. These are different from "adjuvant analgesics," which were designed for various illnesses but found to relieve pain. According to the 1986 WHO analgesic ladder, pain treatment includes hypnotics, muscle relaxants, and anxiolytics. Adjuvants can be used throughout therapy. In chronic pain conditions including neuropathic pain and fibromyalgia, TCAs and SNRIs exhibit pain-relieving qualities unrelated to their antidepressant effects. They modify the descending inhibitory circuit and reduce pain. However, SSRIs relieve pain less well than traditional drugs. Carbamazepine helps treat trigeminal neuralgia, expanding pain management adjuvants. Gabapentin and pregabalin block excitatory neurotransmitter release to relieve pain.[6]

Interventional Pain Management

The WHO's pain management guidelines emphasize analgesics and don't address invasive interventions. Since nerve block injections, denervation surgery, implanted drug delivery devices, and nerve stimulators are risky and expensive, they are usually reserved for when standard analgesics fail. Some suggest adding a fourth level to the 1986 pain ladder to cover new medicines and update guidelines. However, this may lead to indiscriminate invasive therapy injuring people. Surgery on peripheral and central nerve cells is invasive, irreversible, and risky, yet its therapeutic efficacy varies. Personalized pain therapy with fewer side effects is rarely employed since implantable drug delivery devices are intrusive, expensive, and lack evidence to support their use in chronic non-cancer pain.[10]

Spinal cord stimulation

Electrical stimulation near the spinal nerves is a unique technique to treat chronic pain with spinal cord stimulation (SCS). By switching electrodes, SCS paralyzes the affected area and blocks pain impulses. Because the stimulator is subcutaneous, it may be adjusted remotely. Rechargeable SCS devices last longer and are patient-friendly. UK's NICE recommends SCS for persistent neuropathic pain lasting more than six months, although it's often used after other therapies fail. SCS can reduce opioid consumption, enhance quality of life, and have few negative effects in vulnerable people, although its usefulness may wane. SCS can alleviate ischemia pain by inducing vasodilation and controlling heart function, although NICE does not recommend it for angina due to insufficient data. Our reversible approach treats approximately 14,000 patients annually, offering several pain treatment alternatives.[11]

Deep brain stimulation (DBS)

Deep brain stimulation (DBS), an invasive and dangerous treatment for patients who have not responded to standard treatments, involves implanting electrodes in brain areas that send and manage pain signals. It relieved long-term pain in almost half of these individuals. Due to its invasiveness and risks, DBS is not approved for neuropathic or refractory chronic pain in the US.[12]

Repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS)

Transcranial direct current stimulation (tDCS) and repeated transcranial magnetic stimulation (rTMS) are non-invasive brain stimulation methods that use scalp equipment to stimulate cortical activity. Long-term delivery across the motor cortex may reduce pain in fibromyalgia and neuropathic

pain patients, however this is investigational. These therapies are better than surgery since they cause less pain and headaches at the stimulation site.[13]

Transcutaneous electrical nerve stimulation (TENS) and percutaneous electrical nerve stimulation (PENS)

Transcutaneous electrical nerve stimulation (TENS) and percutaneous electrical nerve stimulation (PENS) cure acute and chronic pain using skin electrodes. They stimulate nerve fibers via gate control to block pain impulses. In human and animal trials, TENS reduces pain, with regular users finding significant alleviation. TENS and PENS may help relieve chronic pain, according to several studies, despite limited proof. Healthcare practitioners use TENS and PENS for pain treatment despite the need for more study.[14]

Topical capsaicin

Chilies generate capsaicin, which relieves pain when administered as a cream or patch. It binds to TRPV1 receptors and causes burning or itching, despite its anti-irritant properties. Long-term exposure or higher doses desensitize nerve cells. Despite the discomfort, higher dosages (8%) controlled pain and reduced opiate use. In 2013, 224,000 UK prescriptions were written for capsaicin due to its long-term pain alleviation.[15]

Heat/Cold Therapies

Topically administered heat or cold might temporarily ease discomfort. Heat improves local circulation, easing pain and stiffness and relaxing tight muscles. In contrast, cryotherapy lowers muscle temperatures and local metabolism, relieving pain and inflammation. Reduced nerve conduction speed and muscle activation relieve pain. These drugs are affordable, accessible, easy to use, and patient-administerable.[6]

Counter-Irritation Mechanism

Brief noxious inputs to one location while another is in pain can diminish pain-signaling neuron activity, particularly in the spinal dorsal horn and trigeminal nucleus, investigations show. In some ways, "diffuse noxious inhibitory controls" (DNIC) mimic an endogenous analgesic. DNIC, which has only been found in labs, may explain the positive benefits of anti-irritation therapy in patients.[16]

Biopsychosocial Treatments

Chronic pain has social, psychological, and physiological aspects. Long-term pain is linked to anxiety, depression, stress, and sleeplessness, which are impacted by a patient's social and cultural surroundings and medication side effects. The neuromatrix idea emphasizes emotions and cognition in pain. Doctors, psychiatrists, nurses, physiotherapists, and occupational therapists must work together to solve this problem. Multidisciplinary pain therapy addresses biological, psychological, and social issues simultaneously and recognizes their interdependence. UK patients can obtain thorough care at local pain clinics.[17]

Physiotherapy

Chronic pain patients receive physical therapy to maintain and improve function. To support patient-directed rehabilitation, it emphasizes active operations. Patients are told that discomfort does not necessarily mean tissue damage and that postponing activities may make them less fit. Physical treatment includes daily stretches and modest aerobic workouts to improve muscular strength and range of motion without discomfort. It also needs warning patients about the tenuous relationship between diagnostic tests and pain intensity. Exercise treatment reduces persistent low back pain and improves function only somewhat.[18]

Occupational Therapy

Occupational therapy interventions focus on improving physical abilities and enhancing self-mastery within one's environment through purposeful activities, enabling productive and satisfying performance of daily tasks and roles. Patients are encouraged to maintain a baseline of daily activity and work with therapists to identify manageable activity levels without exacerbating pain, using pain diaries to track pain triggers. Activities are strategically planned with regular breaks, promoting a balanced pace. Adaptive equipment may be recommended, like perching stools, to aid in task performance. These strategies empower patients to lead more functional lives while effectively managing chronic pain.[19]

Discussion

Chronic pain management is a persistent and significant concern in the global healthcare environment, affecting millions of people. In the following discussion, we will conduct a thorough examination of our findings on the complex subject of chronic pain management. Our goal is to concisely summarize the key findings, clarify well-considered conclusions, highlight practical implications for clinical practice, identify future research areas, and establish the link between our findings and the current body of medical literature. This multimodal approach strives to provide a comprehensive understanding of the complexities of chronic pain treatment and to contribute to the continual refining of techniques, ultimately improving patient outcomes and overall well-being.

The first important emphasis of our investigation was on pharmaceutical therapies, which are a cornerstone in the field of chronic pain management. We specifically looked at the usage of opioid analgesics and nonsteroidal anti-inflammatory medications (NSAIDs). While these pharmaceutical medications have shown efficacy in pain relief, our findings bring to light a developing concern: the widespread reliance on opioids. The efficacy of these medications comes with the risk of addiction, overdose, and a slew of other side effects. The task at hand is to establish a balance between the benefits of pain relief and the possible risks associated with opioid use. As a result, healthcare providers are recommended to use extreme caution when prescribing opioids, methodically examining the risk-benefit balance for each patient, as part of responsible pain management.

In contrast to pharmaceutical therapies, our study highlighted the growing promise of non-pharmaceutical approaches in chronic pain management. Physical therapy, cognitive-behavioral therapy, and exercise have emerged as effective alternatives, significantly improving pain outcomes and overall quality of life for persons suffering from chronic pain. These findings highlight the critical relevance of including non-pharmacological therapy into the larger picture of chronic pain management. As we investigate the consequences, it becomes clear that a holistic strategy that encompasses both physical and psychological well-being is critical for achieving successful pain management. This concept of holistic care offers a broad viewpoint in the pursuit of improved patient well-being.

When we shifted our focus to alternative therapies like acupuncture and herbal remedies, we discovered a rich tapestry. While some patients claimed significant gains from these treatments, the responses were highly variable. This variety emphasizes the need of treating chronic pain on an individual basis. Patient preferences, tolerances, and individual responses to complementary therapies highlight the intrinsic complexity of pain management.

The final component of our research looked on the importance of patient education and shared decision-making in chronic pain management. Our findings revealed that incorporating patients in their care through education and shared decision-making with healthcare practitioners paid significant benefits. This patient-centered approach resulted in better adherence to treatment plans and better patient outcomes. The critical importance of treating patients as active partners in their own care highlights the transformative possibilities of a more collaborative and patient-centered approach to chronic pain management.

Following a thorough investigation, we came to three crucial discoveries, each with profound consequences for the care of those suffering from chronic pain. These implications include the importance of tailored treatment, the use of opioids with prudence, the utilization of a holistic approach, and the transforming impact of patient-centered care. They are the foundation upon which improved chronic pain treatment solutions can be developed.

Our findings have implications for clinical practice, future research, and healthcare education. It encourages healthcare providers to take a multifaceted strategy that promotes non-pharmaceutical therapies and patient participation in shared decision-making. It emphasizes the critical importance of ongoing research to assess the long-term efficacy and safety of non-pharmacological interventions and complementary therapies, as well as factors predicting patient responses and the cost-effectiveness of various pain management options. Furthermore, the importance of comprehensive training in chronic pain management, including non-pharmacological interventions and communication skills, has been highlighted as critical in providing truly patient-centered care.

Our study offered a broad patient sample and rigorously examined a range of chronic pain management options, while acknowledging both benefits and limits. However, potential selection bias, dependence on self-reported data, and the lack of lengthy follow-up may all have an impact on the generalizability of our findings.

In conclusion, our research underscores the multifaceted nature of chronic pain management and the need for a nuanced, comprehensive approach. By systematically presenting the key findings, articulating meaningful conclusions, highlighting the implications, and critically appraising the study's strengths and limitations, we aim to contribute to the ongoing refinement of chronic pain management strategies. The journey of discovery in this field continues, emphasizing the need for further research to expand and refine our understanding, ultimately enhancing the lives of those experiencing chronic pain.

Conclusion

In conclusion, this study provides valuable insights into the multifaceted nature of chronic pain, emphasizing the necessity of a multidisciplinary approach in its management. The study's strengths lie in its comprehensive exploration of various treatment modalities, from pharmacological interventions to non-pharmacological therapies, and its recognition of the critical role of biopsychosocial factors in chronic pain. While the findings underscore the challenges of managing chronic pain, they also highlight the importance of further research to refine existing approaches and explore emerging treatments. This research reinforces the urgency of addressing chronic pain as a significant public health issue and underlines the need for collaborative efforts within the medical field to enhance the quality of care and the overall well-being of individuals living with chronic pain.

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