



Cankiri Karatekin University
Graduate School of Health Sciences



Master of Science Thesis

**ASSESSMENT OF THE KNOWLEDGE AND ATTITUDES OF THE
NURSES WORKING IN AL-NAJAF TEACHING HOSPITALS ON
PAIN MANAGEMENT**

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ETHICS STATEMENT

The thesis entitled “**Assessment Of The Knowledge And Attitudes of The Nurses Working In Al-Najaf Teaching Hospitals on Pain Management**” which was prepared and presented as a thesis, was written by myself and in accordance with the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to me and my supervisor. The research pertaining to the thesis was conducted by myself and therefore, all of the sentences and interpretations within the work belong to me.

I declare the aforementioned issues to be correct.

Signature

..... 2023

Amjed Sabah Hasan KHAZAAL

ABSTRACT

ASSESSMENT OF THE KNOWLEDGE AND ATTITUDES OF THE NURSES WORKING IN AL-NAJAF TEACHING HOSPITALS ON PAIN MANAGEMENT

Amjed Sabah Hasan KHAZAAL

Master of Science in Nursing

Advisor: Asst. Prof. Dr. Huri Seval GÖNDEREN ÇAKMAK

2023

The aim of this study was to evaluate nurses' knowledge and attitudes towards pain management.

The study was carried out with 216 nurses working in the emergency department, internal and surgical service and intensive care unit of AL-NAJAF educational hospitals. The study was conducted as a descriptive cross-sectional study in teaching hospitals in Al-Najaf, Iraq, between 20 December 2021 and 16 April 2022. The data were collected face-to-face with the sociodemographic form and the Nurses' Knowledge and Attitude Questionnaire on Pain. The years of employment of 83.8% of the nurses were between 1-10 years and the average years of employment was 6.44 ± 5.47 . When nurses were evaluated in terms of their knowledge and attitude levels, age groups, gender, educational status, years of experience, and fields of study, no statistically significant difference was observed between age groups, gender, educational status, years of experience, fields of study, and knowledge and attitude levels ($p > 0,05$).

Nurses were found to be more knowledgeable about pain assessment and management at a moderate level. As a result, implementations to improve nurses' knowledge and attitudes towards pain management should be supported.

2023, 78 pages

Keywords: Pain; Pain management, nurse, knowledge, attitude

ÖZET

AL-NAJAF EĞİTİM HASTANELERİNDE ÇALIŞAN HEMŞİRELERİN AĞRI YÖNETİMİ İLE İLGİLİ BİLGİ VE TUTUMLARININ DEĞERLENDİRİLMESİ

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2023

Bu çalışmanın amacı, hemşirelerin ağrı yönetimine karşı bilgi ve tutumlarını değerlendirmektir.

Çalışma AL-NAJAF eğitim hastaneleri bünyesinde yer alan acil bölümü, dahili ve cerrahi servis ve yoğun bakım bakım ünitesinde çalışan 216 hemşire ile yürütülmüştür. Çalışma 20 Aralık 2021 ile 16 Nisan 2022 tarihleri arasında Al-Najaf, Irak'ta bulunan eğitim hastanelerinde tanımlayıcı kesitsel bir çalışma olarak yürütülmüştür. Veriler sostodemografik form ve Hemşirelerin Ağrı ile İlgili Bilgi ve Tutum Anketi ile yüz yüze toplanmıştır Çalışmaya katılan hemşirelerin çoğunluğunun kadın (%54,2) ve 20-29 yaş aralığında olduğunu (%62,5) görülmüştür. Hemşirelerin %83,8'inin çalışma yılı 1-10 yıl arasında ve çalışma yıllarının ortalaması 6.44±5.47 idi. Hemşirelerin bilgi ve tutum seviyeleri ile yaş grupları, cinsiyet, eğitim durumları, tecrübe yılları, çalışma alanları açısından değerlendirildiğinde, yaş grupları, cinsiyet, eğitim durumları, tecrübe yılları, çalışma alanları ile bilgi ve tutum seviyeleri arasında istatistiksel anlamlı bir fark görülmemiştir(p>0,05).

Hemşirelerin ağrı değerlendirmesine ve yönetimine karşı daha bilgili düzeyleri orta seviyede bulunmuştur. Sonuç olarak hemşirelerin ağrı yönetimine karşı bilgi ve tutumlarının geliştirilmesi yönünde uygulamalar desteklenmelidir.

2023, 78 Sayfa

Anahtar Kelimeler: Ağrı, Ağrı yönetimi, hemşire, bilgi, tutum

GENİŞLETİLMİŞ ÖZET

AL-NAJAF EĞİTİM HASTANELERİNDE ÇALIŞAN HEMŞİRELERİN AĞRI YÖNETİMİ İLE İLGİLİ BİLGİ VE TUTUMLARININ DEĞERLENDİRİLMESİ

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2023

Ağrı, hastanın yaşam kalitesi, doyumu ve rahatlığı üzerinde etkiye sahip olan stresli bir durumdur. Ayrıca hastanın Huzursuz hissetmesine, kontrol kaybına, tükenmişliğe ve yaşam kalitesinde düşüşe neden olabilir. Hastaya ilişkin olarak tedavi edilmeyen ağrı durumu, hastanın genel yaşam kalitesi üzerinde olumsuz bir etkiye sahip olduğundan ağrı yönetimi önemlidir. Hemşireler, diğer sağlık personellerine göre hasta ile daha fazla vakit geçiririler ve hastayı bütüncül değerlendirmeye daha yatkındırlar. Bu nedenle hemşireler, ağrı yönetimi söz konusu olduğunda karar verme ve izleme sürecinde kritik bir rol oynamaktadır. Bu çalışmanın amacı, hemşirelerin ağrı yönetimine karşı bilgi ve tutumlarını değerlendirmektir. Çalışma 20 Aralık 2021- 16 Nisan 2022 tarihleri arasında yapılmıştır. Çalışmanın evrenini, Al Naafda bulunan Al-Sadr Eğitim Hastanesi, Al-Furat Eğitim Hastanesi ve Al-Hakeem Eğitim Hastanesi olmak üzere eğitim hastanelerinde çalışan hemşireler oluşturmuştur. Çalışmanın örneklemini ulaşılabilen 216 hemşire oluşturmuştur. Veriler sosedemografik form ve Hemşirelerin Ağrı ile İlgili Bilgi ve Tutum Anketi ile toplanmıştır. Ferrell ve arkadaşları (1993) tarafından geliştirilmiş 39 maddelik bir ölçüm aracıdır. Ölçekte ilk 22 madde doğru/yanlış, 13 madde (23-35 arası sorular) çoktan seçmeli ve 2 vaka çalışmasına bağlı 4 madde (36-39 arası sorular) yine çoktan seçmeli sorular olmak üzere toplamda 39 maddeden oluşmaktadır. Her bir doğru yanıt 1 puan, yanlış veya boş bırakılan yanıtlar 0 puan olup; toplam puanlar 0-39 arasında değişmektedir. Alınan puanlar yüzde olarak ifade edildiğinde değerlendirmesi üç kategoriye ayrılır. Veriler 20 Aralık 2021 ve 16 Nisan 2022

tarikhleri arasında arařtırmacı tarafından yüz yüze toplanmıřtır. Hemřirelerin %54,2'si kadın; %45,8 erkek cinsiyetinde, yař ortalamaları 28.55 ± 5.75 idi. Hemřirelerin %83,8'inin alıřma yılı 1-10 yıl arasında ve alıřma yıllarının ortalaması 6.44 ± 5.47 idi. Hemřirelerin %53,2'si ađrı yönetimi konusunda herhangi bir eđitim almamıřtır. Hemřirelerin ađrı yönetimi hakkındaki bilgi ve tutumları öleđi sonucu deđerlendirildiđinde (0.50) orta olarak bulunmuřtur. Hemřirelerin ađrı yönetimi konusundaki bilgi ve tutumlarının %9,72'sinin zayıf, %86,11'i orta düzeyde ve %4,17'sinin iyi olduđu görölmektedir. Hemřirelerin bilgi ve tutum seviyeleri ile yař grupları, cinsiyet, eđitim durumları, tecrübe yılları, alıřma alanları aısından deđerlendirildiđinde, yař grupları, cinsiyet, eđitim durumları, tecrübe yılları, alıřma alanları ile bilgi ve tutum seviyeleri arasında istatistiksel anlamlı bir fark görölmemiřtir($p > 0,05$). Hemřirelerin ađrı yönetimi konusunda eđitim alma durumları ile bilgi ve tutumları arasında istatistiksel olarak anlamlı bir fark var idi. Ađrı yönetimi konusunda eđitim alan hemřirelerin bilgi ve tutumları eđitim almayan hemřirelere göre istatistiksel olarak daha yüksek idi.

Genel olarak, katılımcıların seilen bilgi ve tutum yönündeki performansı orta seviyede idi. Ađrı yönetimi ile ilgili yeterli bilgi ve tutum olarak kabul edilen %80 veya daha yüksek ortalama puan hiçbir katılımcı tarafından elde edilememiřtir. Eđitim düzeyi (lisans) yüksek olan hemřireler, diploma ve sertifika düzeyindeki hemřirelere göre anlamlı olarak daha yüksek bilgi puanına sahiptir. Hemřireler, farmakolojik ve farmakolojik olmayan müdahaleler hakkında daha fazla bilgiye ve farklı kültürel geçmiřlere sahip hastalara yeterince bakım vermek için eđitime ihtiya duyarlar. Hastaneler, ađrı deđerlendirmesini teřvik etmek için müdahaleleri, yöntemleri ve rutinleri, hemřireler ve hastalar arasındaki iletiřimi ve ađrıyı azaltmak için farmakolojik olmayan müdahaleleri teřvik etmemektedir. Bu alıřma, ađrı yönetimi ile ilgili artan eđitimin yanı sıra tüm klinik hemřireler için becerilerin yıllık olarak deđerlendirilmesini önermektedir. Eđitim programlarında kazanılan uzmanlık, hemřirelerin bilgilerinin güncel tutulması için düzenli olarak yürütölen alıřtaylar ve kurslarla geliřtirilebilir.

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Amjed Sabah Hasan KHAZAAL

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INDEX OF ABBREVIATIONS AND SYMBOLS

IASP	International Association for the Study of Pain
IOM	Institute of Medicine
WHO	World Health Organization
PNS	Peripheral nervous system
CNS	Central nervous system
COX	Cyclooxygenase
NMDA	N-methyl-D-aspartate
PAG	Periaqueductal gray
BTP	Breakthrough pain
NSAIDs	Nonsteroidal anti-inflammatory drugs
GI	Gastrointestinal
TENS	Transcutaneous electrical nerve stimulation
KASRP	Knowledge and attitudes survey regarding pain
δ	Delta
β	Beta

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1. INTRODUCTION

The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” (Aydede, 2019). Pain is a stressful condition that has an impact on the patient's quality of life, satisfaction, and comfort. It can lead to discomfort, loss of control, exhaustion, and declines in quality of life, sexual activity, personal relationships, life meaning, work performance, sleep, and everyday activities (Arab et al., 2016). Acute and chronic pain are two different kinds of pain. The occurrence of acute pain is frequently related with an injury, surgical procedure, infection, or illness. It has a biological function in that it protects against tissue injury (Noroozian et al., 2018). Acute pain may be effortlessly pinpointed and is likely to subside as the damage heals. In comparison, chronic pain does not serve any biological function. It was claimed that chronic or persistent pain occurs as a result of inadequate assessment and management of acute pain (Ellis et al., 2019). The presence of pain as a result of pathological illnesses, medical treatments, and trauma necessitates the need for pain management in hospital settings. Pain relief is a critical nursing goal that is reflected in the philosophy of the profession (Germossa et al., 2018). There is increasing knowledge about the genesis of pain with the development of pharmaceutical pain management. Despite this consciousness and pharmacological progress, patients still experience unbearable pain, which obstructs the physical, spiritual, and emotional dimensions of health (Dames et al., 2016). When it comes to patient management, pain control is critical since untreated pain has a passive impact on the patient's overall quality of life (Bartoszczyk & Gilbertson-White, 2015). Nurses spend a large part of their time caring for patients. Consequently, nurses play a critical role in the process of decision-making when it comes to the management of pain. They must be sufficiently prepared and aware of pain assessment and management strategies. They must avoid holding erroneous assumptions regarding pain management, which can result in ineffectual and inadequate pain management techniques (Alqahtani & Jones, 2015).

Nurses tend to focus on how to deal with the disease that causes the suffering rather than the cause of pain itself, despite their experience managing patients in pain. Cogan et al. (2014) stated that pharmacological intervention and analgesic prescriptions are preferred because of how much time is spent evaluating and assessing pain and how many people need care in the unit (Cogan et al., 2014). Pain management may be misunderstood or seen negatively by nurses (Alqahtani & Jones, 2015). False beliefs include the views that patients request interest rather than report true pain, that opioids cause quick addiction, and that vital signs are the only way to accurately reveal pain. Numerous strategies were tested in an attempt to overcome these provider-related obstacles. Eliminating these barriers resulted in a considerable change in the attitudes and practices of the healthcare team about pain management (Samarkandi, 2018). Nurses think they have limited comprehension of pharmacology, which leads to unhappiness with their academic performance. Obstacles to improving pain in patients include a lack of expertise among nursing lectures, poor training in pain management, and inaccurate information from textbooks. Patients frequently avoid reporting pain or postpone reporting until it reaches a severe level because they assume healthcare professionals are 'too busy,' have more vital or critically sick patients to attend to, or are afraid of causing problems (Sikawa, 2018). Nurses with a good background in pain management and the ability to deliver personalized care to patients with the appropriate attitude can have a significant impact on pain management. Thus, patients' pain-related suffering can be reduced and their quality of life improved (Yava et al., 2013).

1.1 Importance of the Study

Pain is an individual sensation that can't be detected from biological significance and is mostly dependent on the patient's description. Pain assessment, for the most part, is done by asking a patient about their pain. It is very important that suitable treatment is given. However, it is frequently stated that there is a paucity of pain detection and management (British Pain Society, 2007). This can lead to uncontrollable pain, which can have bad psychological and physical effects on the patient (Gregory & McGowan, 2016).

The Institute of Medicine reports that approximately 100 million people in the United States suffer from chronic pain. This number is higher than the total number of patients who have diabetes, heart disease, and cancer combined. Chronic pain is estimated to cost the United States economy between \$560 and \$635 billion per year, which includes healthcare expenses and lost productivity. It's important to remember that these estimates don't incorporate cancer-related pain. In Europe, according to a cross-sectional survey, 19% of individuals suffered from moderate to severe chronic pain, with around half receiving insufficient management of pain. In Australia, it was projected that one in every five people will experience chronic pain during their lifetime, costing the economy an estimated AUD 34 billion each year. According to reports and studies, chronic pain affects a significant proportion of the adult Australian population, notably those of working age (Saied & Mansour, 2021). Previous studies also pointed to nurses' inadequacy in appropriately assessing and managing pain due to a lack of suitable knowledge and attitudes about efficient pain management. The knowledge and assessment of pain by nurses is a crucial element of nursing care, as it allows healthcare providers to manage pain as best as possible. Precise and effective pain management needs effective knowledge, favorable attitudes, and clinical decision-making skills regarding pain. Frequently, nurses develop their views and impressions about pain from their profound knowledge, which may result in a negative attitude toward pain management on the part of the nurses if their information is erroneous, inadequate, or incorrect. Many pain-related issues, such as inaccurately evaluating pain as less severe than it actually is, lack of knowledge about pain medications, and thinking that the patient exaggerates their pain, can lead to ineffective pain management. These issues are directly influenced by the nurse's personal knowledge and attitudes about pain and pain management (Issa & Khraisat, 2017). Pain management practices are a collection of activities that nurses must implement to efficiently control pain among their patients. Assessing the patients' pain, offering suitable nursing interventions to alleviate the patients' pain, and reassessing the patients' pain after interventions are all included in these activities (Alzghoul & Abdullah, 2016).

Despite decades of research in the field of pain management, advancements in pharmacological therapy, and tremendous technological advances, several studies found that patients do not obtain effective pain management in general. Pain is a complicated phenomenon that necessitates collaboration and implementation of therapeutic treatment techniques by doctors and nurses who have direct contact with patients. However, nurses, as the most numerous health team members who should advocate for patients' rights are typically the first to notice when patients are in pain since they spend the most time with patients, and frequently incorporate pain as a diagnosis in the care plan (AlReshidi, 2016). Effective pain management enhances function, decreases complications, and shortens hospital stays. On the other hand, poorly managed pain is connected with decreased activity, poorer sleep, malnutrition, anxiety, delayed healing, depression, and poor quality of life. Therefore, it is critical to effectively regulate or manage pain, not only for humanitarian reasons, but also to avoid the negative repercussions of unalleviated pain (Herr, 2011). Effective pain management requires a combination of factors, including effective communication between nurses and patients, as well as proper nursing knowledge, attitudes, and beliefs regarding pain and pain medications. The administration of appropriate pain management might be jeopardized if any of these criteria is lacking. The Institute of Medicine [IOM] (2011), for example, stated that there was a need to improve healthcare providers' attitudes toward pain management since there was a contradiction between this and patients' views of pain management. This was discovered to be possible through study and continued education (AlReshidi, 2016).

1.2 Statement of the Problem

The most prevalent reason for a visit to a healthcare professional is pain. Inadequate pain management is associated with significant human and economic consequences for patients, in addition to their families, and society as a whole. Pain relief is a critical nursing goal that is reflected in the profession's philosophy. Orderly pain assessment, administration of medication, and clinical observation of the patient's responses are all responsibilities of

nurses. These responsibilities necessitate an awareness of the pattern of pain with regard to the clinical state of a patient. Nurses' lack of knowledge, unfavorable attitudes, weak assessment skills, unwillingness to serve as the patient's advocate, and misunderstandings create important challenges to pain control for hospitalized patients, despite the fact that it has central importance for all healthcare providers. Adequate pain knowledge helps nurses enhance their practices in the assessment of pain, administration of medication, and monitoring. Nurses' attitudes may have an impact on patient care (Saied & Mansour, 2021).

1.3 Study Objectives

- To assess nurses' knowledge and attitudes towards pain management.
- To determine the relationship between nurses' knowledge, attitudes and their demographic characteristics.

2. LITERATURE REVIEW

2.1 Pain Overview

Pain is an uncomfortable sensation that is caused by actual or potential tissue damage and includes sensory, cognitive, emotional, and social components (Williams & Craig, 2016). One of the most frequent signs and symptoms that patients report is experiencing pain. In addition, experiencing pain is something that affects all humans, and the World Health Organization (WHO) acknowledged quite some time ago that pain is a global issue. In order to find a solution to this issue, more people will need to work together to achieve the highest possible level of control (Al Qadire & Al Khalaileh, 2012). The sensation of pain is one of the body's most significant and effective protective or preventative processes. In the event of an accident, pain may assist in the process of reducing and preventing more harm from occurring. For instance, a patient who has a fracture will carry and guard the broken limb in

order to prevent more harm. Similarly, a child who touches a hot stove will pull their hand away in order to avoid the creation of a larger burn and the aggravation of injury (Hopper & Williamson, 2015). Pain is not only an unpleasant or painful sensation that can be brought on by an accident, stress, or sickness; in addition, pain can be caused by emotional events apart from the breakdown of tissue. For instance, one may use the word "pain" to describe the emotional state that is associated with grief, sadness, or even love that is one-sided. In addition, the feeling of pain is highly individual and highly subjective. The way in which a person communicates their suffering is heavily influenced by factors such as their culture, level of life experience, and conduct (Nair & Peate, 2013). There is a significant prevalence of acute and chronic pain, notably among surgical patients and those receiving general medical care in the hospital. Pain is felt by more than half of patients in the hospital. The estimated prevalence rates for cancer patients are 39% following curative treatment; 55% throughout anticancer therapy; and 66.4% in metastatic, advanced, or fatal disease. Approximately 38% of patients state they are in moderate to severe pain. Patient suffering and pain must be reduced in order to provide quality healthcare. Quality of life, bodily function, social connections, and psychological health are all impacted by pain. Pain is frequently accompanied by other symptoms such as exhaustion, insomnia, lack of appetite, and worry. Pain, if left untreated, can lead to major consequences, such as increased healthcare use, length of hospital stay, and expenses (Salim et al., 2020). Pain affects people of all ages, genders, races, and socioeconomic classes. It is the most common reason people seek medical help, and is also one of the most prevalent problems that nurses treat. Untreated pain has the potential to influence every system in the body and generate a slew of negative consequences, some of which can last a lifetime. Despite significant breakthroughs in current understanding of the basic processes of pain and the availability of better analgesic medications and technologies, as well as non-pharmacologic pain treatment strategies, various kinds of pain continue to be undertreated (Hinkle & Cheever, 2018). Pain is sometimes difficult to measure and judge effectively due to its subjectivity, with sensations experienced by any one individual having both emotional and physical overtones. Pain is a necessary and protective sensory phenomenon for survival. In general, any stimulation that destroys or has the potential to damage tissue causes pain. Pain warns the individual of

pathologic insults to the body and may allow avoidance of the offending disease or stimuli. However, when signaling becomes abnormal and prolonged, the individual's sense of pain becomes harmful, both psychologically and physically. Pain is not necessarily linked to a stimulus. There may not be a clear link between how much pain someone feels and how badly their tissues are injured (Ringkamp et al., 2018). The most common symptom for which people seek medical help is pain. As a result, the practice of every professional registered nurse must include pain assessment and management. The purpose of pain management nursing is to reduce patients' suffering and pain, while also improving their function across their lifespan and in any practice situation. Understanding the pathophysiology of pain, being able to conduct a full assessment, and utilizing approaches for increasing pain relief, maximizing function, and maintaining quality of life are all important aspects of pain management nursing. A holistic approach to patients' biopsychosocial and spiritual needs is inherent to this procedure (American Nurses Association, 2016). Changes connected to social and physiological disorders impact the quality of life in all people suffering from pain. These disorders depend mainly on the intensity and duration of pain, rather than the cause of the pain. Sleep and eating issues, decreased libido and sexual activity, psychomotor heaviness, and diminished pain threshold are all typical in chronic pain patients. Sleep problems are defined by a patient's inability to find a comfortable position that allows them to fall asleep. Sleep is uneasy, and pain episodes keep interrupting it. After waking, many patients experience lethargy, as well as physical and mental exhaustion. Changes in food-related behavior are also a result of chronic pain. The patient frequently experiences hunger reduction and weight gain. Some patients experience anxiety and a strong desire to eat, which, along with limited activity (because of pain), can lead to obesity and decreased physical activity (Świeboda et al., 2013). Chronic pain sufferers have a gloomy mood, displaying not only melancholy but also irritation and angry outbursts. This causes frequent disputes with family and friends, as well as the gradual disappearance of social life, symptoms, psychological isolation, and a withdrawn, significantly decreased perception of the world available to sufferers. Patients spend the majority of their time in supine position, their thoughts focused on the pain and the ongoing quest for causes and strategies to find relief. Most patients are unable to work, resulting in a considerable reduction in their income,

lifestyle, and family status. Patients who are suffering from severe and chronic pain see their condition as hopeless. They seek more and more additional surgical treatments, as well as the prescription of medicines, out of desperation (Świeboda et al., 2013).

2.3 Pain Theories

When it comes to attempting to define the physiology of pain, there have been many different hypotheses developed. Style theory, central inhibition, gate control theory and specificity theory are some examples of these. The gate control hypothesis is one that is used most frequently in the nursing literature, and ever since it was initially proposed in 1965, it has garnered overwhelming approval from the nursing community. This brief comment shows that activating the dermatological system can lead to stimulating nerve impulses, which then progress along the peripheral nerves, make their way to the spinal cord, and finally make their way to the brain. The spinal cord has a "gate" that may either prevent pain signals from being sent or allow them to proceed. Pain signals that are conveyed by smaller fibers are allowed to pass, whereas signals sent by larger fibers are prevented from passing (AlReshidi, 2016).

2.4 Types and Categories of Pain

There are several classifications that may be applied to pain, and it is not always easy to distinguish clear differences between them. Pain is frequently classified as either being chronic or acute (which simply means persistent) (MacIntyre & Schug, 2014). Acute pain differs from chronic pain in that it lasts for a shorter period of time. Tissue injury caused by burns, trauma, or surgery, for example, causes acute pain that will last a short time and diminish with healing. Chronic pain can be cancer-related or non-cancer-related, and it can last a short period of time (e.g., a few months) or for the rest of a person's life. Peripheral

neuropathy from back or neck pain after an injury, diabetes, and osteoarthritis pain from joint deterioration are all examples of chronic pain. Acute and chronic pain can both be caused by certain illnesses. For example, some cancer patients have ongoing chronic pain as well as acute exacerbations of pain on a regular basis (Mantyh, 2013). Nociceptive pain and neuropathic pain are the two types of pain that are most accurately categorized by their presumed underlying pathologies. The term "nociceptive pain" refers to the proper functioning of physiologic systems, which results in the perception of noxious stimuli (tissue injury) as being painful. This type of pain is referred to as "physiologic pain." Because of this, nociception is often referred to as the "natural" kind of pain transmission. Pain that is pathologic and resulting from improper processing of sensory information by the nervous system is called neuropathic pain (pathophysiologic pain). This abnormal processing might be the consequence of injury to the peripheral nervous system (PNS), the central nervous system (CNS), or both. Patients can suffer from both nociceptive and neuropathic pain at the same time (Hinkle & Cheever, 2018).

2.5 Physiology of Pain

Based on where the unpleasant sensation is coming from, there are two main types of pain that may be classified under the physiology of pain. Nociceptive pain and neuropathic pain are the terms used to refer to these two different classes of suffering (Doody & Bailey, 2019). The term "nociceptive pain" refers to the normal functioning of physiologic systems that results from the perception of noxious stimuli (tissue damage) as being painful. This type of pain is known as "physiologic pain." Because of this, nociception is often referred to as the "natural" kind of pain transmission. Pain that is pathologic and caused by improper processing of sensory information by the neurological system as a result of injury to the peripheral nervous system (PNS), the central nervous system (CNS), or both of these systems is referred to as pathophysiologic pain. Patients might experience both nociceptive and neuropathic pain simultaneously (Hinkle & Cheever, 2018).

2.5.1 Nociceptive pain

Nociceptive pain is a natural biological response to injury and can be caused by injured tissues, including muscles, internal organs, and/or bone. This demonstrates an additional breakdown of nociceptive pain. Somatic and visceral pain are the two basic types of nociceptive pain. Somatic pain refers to damage to the skin, muscles, and bones of the musculoskeletal system. A minor cut on the skin's surface might cause superficial somatic damage. A fractured hip is an example of serious somatic injury. Visceral pain, also known as referred pain, is associated with tissues of the internal organs and can be felt indirectly (Orr et al., 2017). The term "nociceptive pain" refers to pain that is triggered by the activation of nociceptors in response to real or potential injury to non-neural tissues. This type of pain can be acute or chronic. Nociceptors are sensory nerve endings (also known as receptors) that react to noxious stimuli, also known as painful stimuli. They detect both the physical and chemical harm that has been done to the tissues. Disease, trauma, surgical treatments, procedural pain (injections, etc.), and even intentionally self-inflicted injuries can all be potential sources of nociceptive pain. Transduction, transmission, perception, and modulation are four separate processes that are involved in nociception. There are three fundamental categories of nociceptive receptors: chemical, thermal, and mechanical (Doody & Bailey, 2019).

2.5.1.1 Transduction

The term "transduction" refers to the processes through which noxious stimuli, such as burns or surgical incisions, activate these neurons. Nociceptors can be activated by noxious stimuli like a burn or an incision. Nociceptors are primary afferent neurons that are located throughout subcutaneous tissue, in the skin, as well as somatic (musculoskeletal) and visceral (organ) structures of the body (Smith, 2013). These neurons have the potential to respond selectively to painful stimuli, which are created as a result of tissue damage caused by chemical (e.g., toxins or chemotherapy), thermal (e.g., burn or frostbite), mechanical (e.g.,

incision or tumor development), or infectious sources. A number of excitatory substances, such as bradykinin, serotonin, prostaglandins, substance P, and histamine, are released when noxious stimuli are experienced. These compounds are responsible for the propagation of pain along the pain pathway. At the location of an injury, the production of prostaglandins, which are lipid molecules, causes an inflammatory response that results in increased tissue swelling and discomfort. Arachidonic acid is converted into prostaglandins by the action of the enzyme cyclooxygenase (COX). Isoenzymes of the COX enzyme, COX-1 and COX-2, play a significant part in the effects of nonopioid analgesic agents (Ringkamp et al., 2018).

2.5.1.2. Transmission

The process of transmission is involved in nociception. When transduction occurs effectively, it results in the generation of an action potential, which is then carried down the A-delta (δ) and C fibers. The unmyelinated C fibers are slower to conduct and have less myelination than the A- δ fibers, which have more. The terminals of A- δ fibers are responsible for the detection of thermal and mechanical damage, the relatively fast localization of pain, and the rapid withdrawal from the painful stimulus in response to the stimulus. Unmyelinated C fibers are sluggish impulse carriers that respond to chemical, mechanical, and thermal stimuli. This kind of fiber may be distinguished by its lack of myelin sheathing. They cause pain that is not well localized and frequently takes the form of burning or aching. A-beta (β) fibers are the largest of the fibers and respond to movement, vibration, and touch. However, they do not often send pain signals (Todd & Koerber, 2006). The synapses in the dorsal horn of the spinal cord and the dorsal root ganglia are where information that is potentially harmful is processed. An action potential is formed, and the impulse that results travels from there to the spinal cord, where it is received by the brain, which is the location where one experiences pain. Complex neurochemical pathways are responsible for the extensive modulation that takes place in the dorsal horn. Glutamate, neurokinins, and substance P are some of the transmitters that are released by the major A-and C fibers. Glutamate is an essential

neurotransmitter because it facilitates the transmission of pain signals and attaches to the NMDA (N-methyl-D-aspartate) receptor (Leung, 2015).

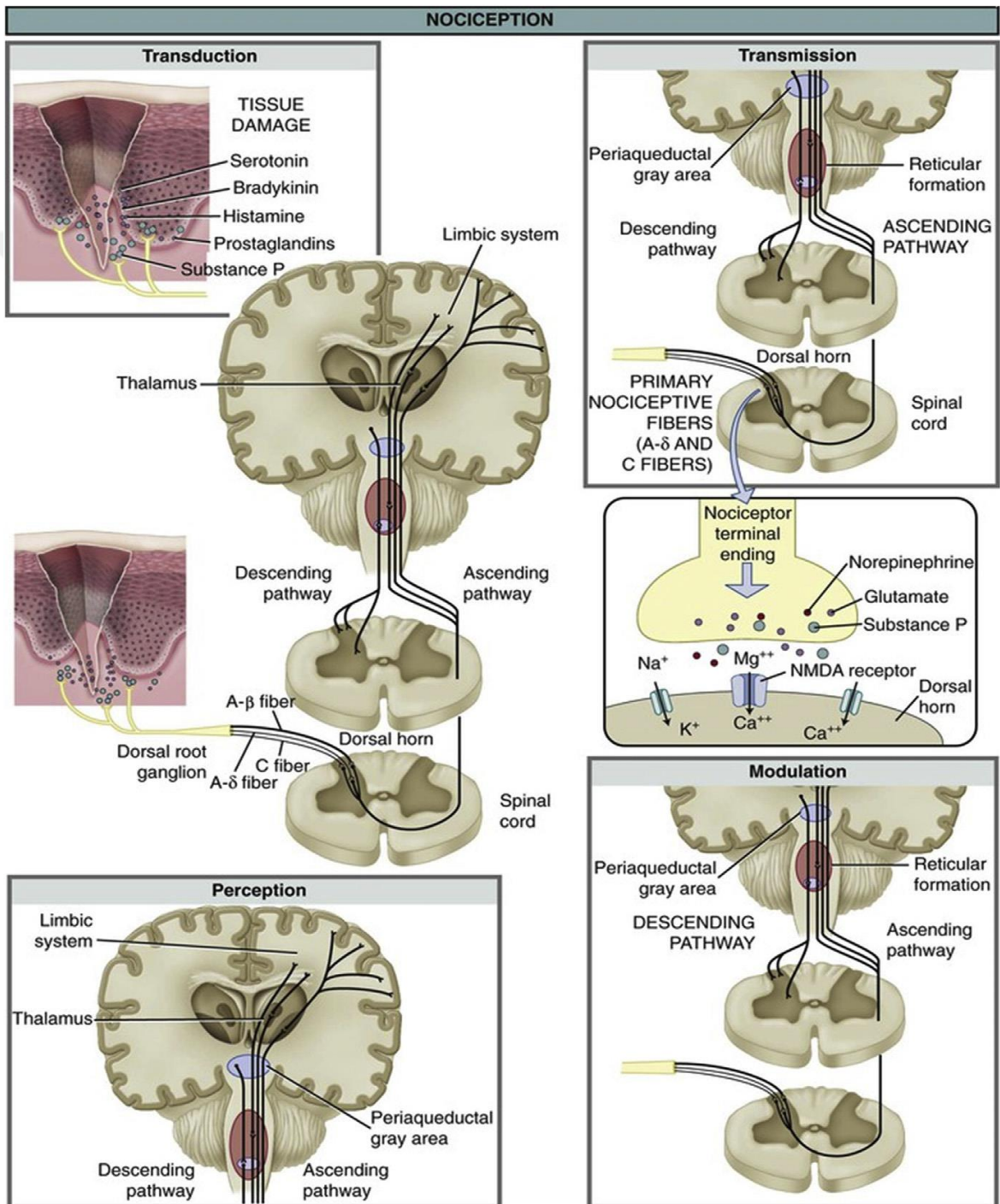


Figure 2.1 Four phases in the nociception of pain (Ellison, 2017).

2.5.1.3. Perception

The experience of the feeling constitutes the third stage of the nociception process. When we talk about an individual's unique sensory experience, we are referring to their perception, which is the "decoding" or interpretation of afferent information in the brain. Perception is what gives rise to an individual's distinct sensory experience. Being conscious of one's own suffering is the sensation described here. The reticular and limbic systems, in addition to the cerebral cortex, are terminal sites for the transmission of impulses; perception occurs at these specific places. The events happen quite close to one another in time. It is possible for a wide range of factors, including but not limited to one's genetics, gender roles, cultural preferences, life experience, previous pain experiences, and current level of health, to influence a person's perception of pain. This is because one's perception of pain is susceptible to being shaped by a wide range of circumstances (Ellison, 2017).

2.5.1.4. Modulation

An endogenous system in the body is capable of dissociating and modulating (increasing or decreasing) the transmission of pain. This phenomena may be explained by a number of different mechanisms, some of which include the endogenous opioid system, segmental inhibition, and the descending inhibitory nerve system. Altering one's experience of pain may also be accomplished through the utilization of cognitive and coping methods. Segmental inhibition, which is more widely known as the "gate theory," postulates that the synapses between afferents that transmit painful stimuli (Ad and C fibers) and neurons in the dorsal horn of the spinal cord can be blocked. This is inferred from the fact that segmental inhibition is more widely known as the "gate theory." The discovery of receptors for opium derivatives in the central nervous system (ventral medulla, periaqueductal gray (PAG)), in addition to the spinal cord, led to the development of the endogenous opioid system (lamina I and lamina

II). Endorphins, dynorphins, and enkephalins are the three categories of endogenous chemicals that were subsequently recognized and categorized. These endogenous chemicals modify the pain signal by binding to the opioid receptors in the pain pathway and therefore reduce its intensity. In conclusion, the descending inhibitory nerve system is responsible for controlling the transmission of harmful signals through the use of the neurotransmitters serotonin and norepinephrine. Before forming synapses in the dorsal horn of the spinal cord, the limbic system sends projections to the PAG and the medulla. Both serotonin and norepinephrine are secreted in order to block the transmission of pain across the pain pathways and reduce the intensity of the pain signal that is produced in the dorsal horn (Lee & Neumeister, 2020).

2.5.2 Neuropathic pain

Pain is caused when damaged nerves either react improperly to stimuli or release impulses even when they are not being triggered, and this is a complicated phenomenon that is not well understood. Neuropathic pain is pain that is caused by a disease or lesion of the somatosensory nervous system. Neuropathic pain can be divided into two categories: central neuropathic pain, which affects the brain and spinal cord, and peripheral neuropathic pain, which affects the rest of the body. The location of the lesion or disease determines which category a patient falls into. Wherever there is aberrant processing of sensory input by the central or peripheral nervous system, pain will be present (Doody & Bailey, 2019). It is possible that neuropathic pain as the expression of various processes that occur in both the central and peripheral nervous systems, which ultimately lead to the sensitization of both of those systems. There are a variety of potential therapy options available as our understanding of the underlying pathophysiology of neuropathic pain continues to expand. However, the challenge still lies in determining which mechanism is more prominent in a given person and then targeting that mechanism in an effective manner. In actuality, numerous distinct processes can coexist at the same time and shift over the course of time, and an individual's reaction to a treatment can never be predicted (Zilliox, 2017).

Peripheral nerve injuries, an increase in the excitability and sensitivity of primary sensory neurons, and cells in the dorsal root ganglia are the key contributors to the development of peripheral neuropathic pain (peripheral sensitization). Some examples of this condition include diabetic neuropathy, nerve entrapment, and chronic pancreatitis (Ellison, 2017). New growth that develops from an injured nerve in the peripheral nervous system will spontaneously fire, and over time, connections may form between these new regions of development and neighboring afferent neurons. In this manner, neuropathic pain can originate from either damaged or healthy sensory neurons. Damage to neurons also results in an increase in the number of sodium and calcium channels that are active in the affected neurons. Other factors that might contribute to peripheral sensitization include increased sensitivity to the inflammatory mediators that are produced when cells are injured and the sprouting of sympathetic neurons in the dorsal root ganglia (Zilliox, 2017).

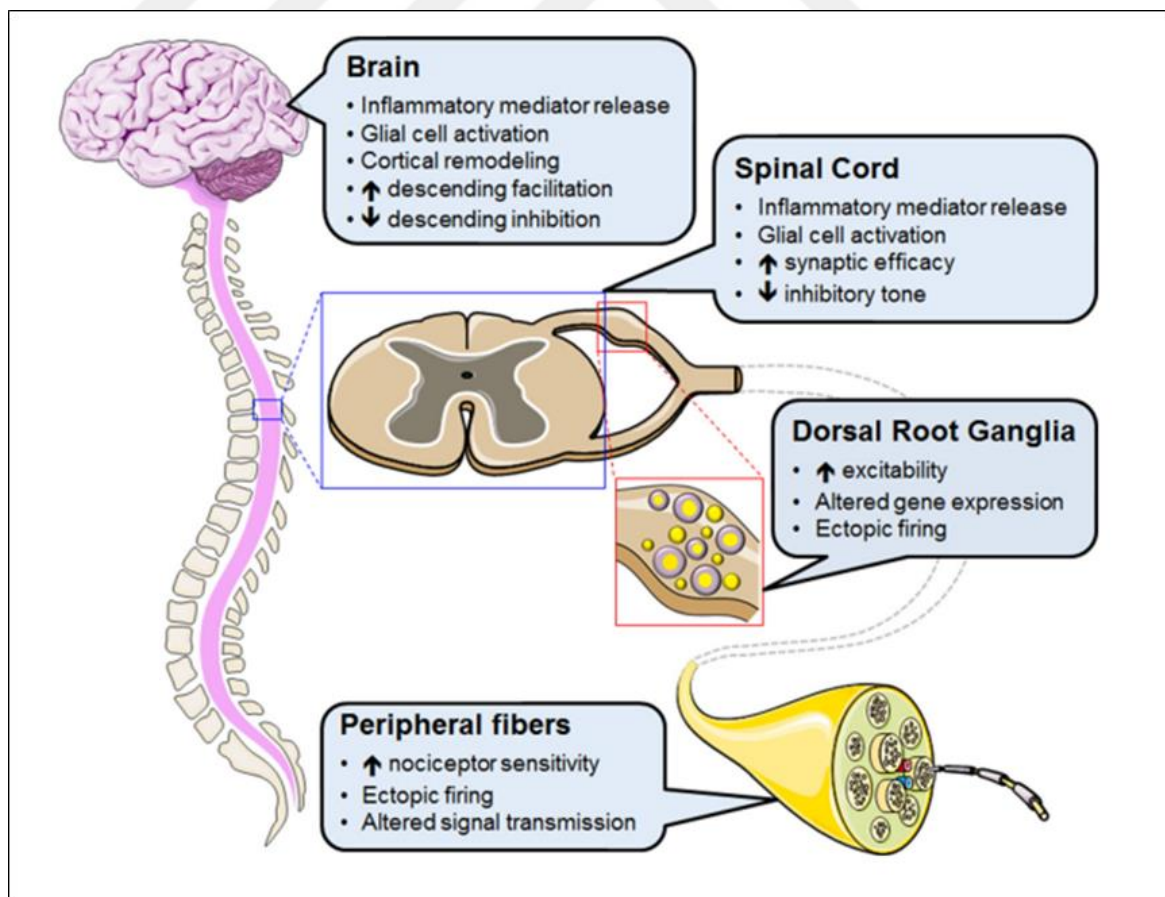


Figure 2.2 Overview of central and peripheral changes contributing to neuropathic pain (Meacham et al., 2017).

Pain that originates from the brain and spinal cord is referred to as "central pain," whereas pain that originates from the peripheral nervous system is often referred to as "deafferentation" pain. Classical descriptions of neuropathic pain include numbness, burning, pins and needles, electric shock and tingling (McKenzie & Purcell, 2013). A malfunction or lesion in the spinal cord or the brain is often the root cause of central neuropathic pain. The increase in group C neurons into the dorsal horn by gradual and repetitive stimulation results in an increase in the sensitivity of the neurons that are responsible for central pain signals (central sensitization). Because of this, pathologic alterations occur in the CNS, which ultimately lead to chronic pain. Trauma to the spinal cord or the brain, tumors, multiple sclerosis, vascular lesions, Parkinson's disease, post-herpetic neuralgia, and phantom limb pain are some examples of conditions that can cause this type of pain (Ellison, 2017).

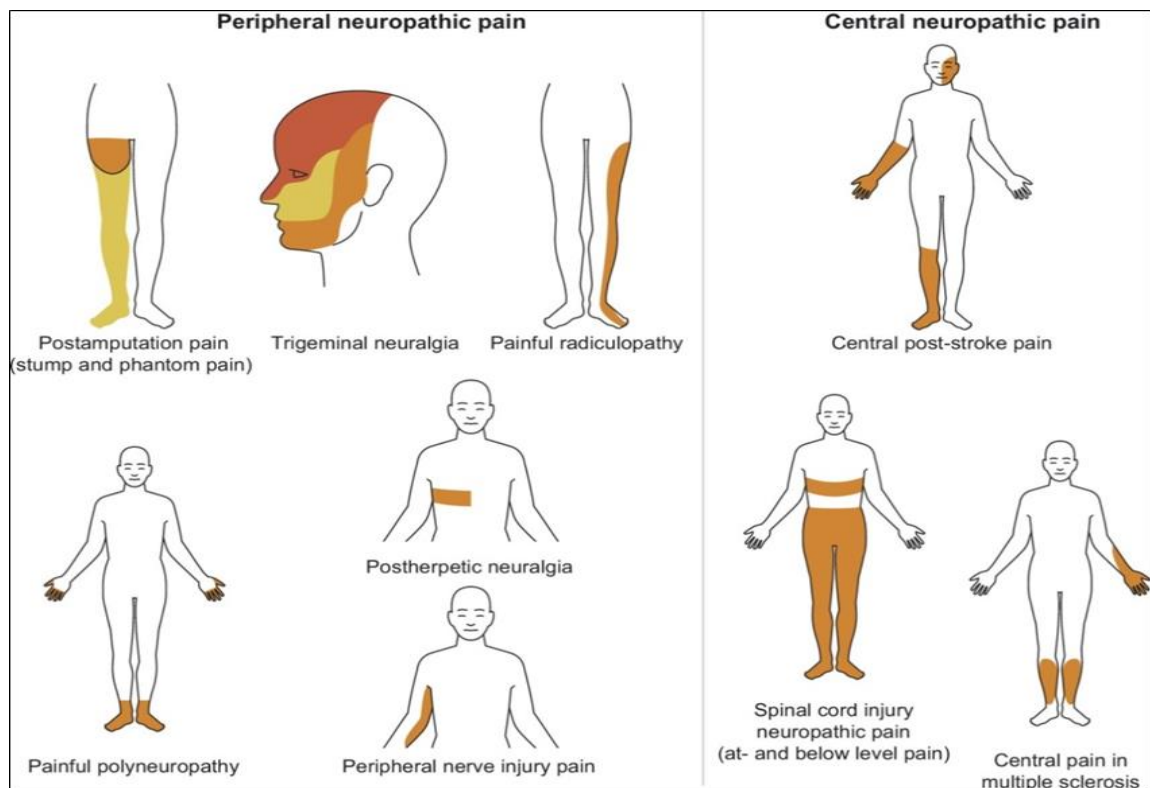


Figure 2.3 Classification of neuropathic pain, as well as examples of sensory abnormalities and pain neuroanatomical distribution (Finnerup et al., 2020).

2.6 Classification of Pain

Pain can be acute or chronic, depending on how long it has been present. Pain is considered to be acute when it is both dynamic and fleeting, and when it is followed by a significant increase in the intensity of both emotional and autonomic nervous system reactions. This kind of pain is typically caused by an accident, damage to the tissues, or surgery, and it triggers the "fight or flight" reaction in the body. The term "chronic pain" refers to discomfort that persists beyond the normal time frame of 3-6 months expected for recovery. In addition, cancer pain may be defined differently than acute or chronic pain since it is a combination of nociceptive and neuropathic pain. This makes cancer pain distinct from both of these types of pain. Cancer pain follows the same neurophysiologic pathway as other types of pain. This means that cancer pain originates directly from the primary tumor or from the metastatic spread of the disease. Cancer pain can be either acute (caused by perforations or pathological fractures) or chronic (caused by bone metastases) (Doody & Bailey, 2019).

2.6.1 Acute pain

Acute pain affects virtually everyone at some point in their lives. Acute pain that lasts just a short period of time provides a biological function in that it serves as a warning signal by stimulating the sympathetic nervous system and producing a variety of physiologic reactions. This is an example of how pain may serve a biological purpose. Experiencing significant acute pain can cause a variety of physiological responses, including elevated vital signs, increased perspiration, and dilated pupils. Restlessness, inability to concentrate, fear, and varied degrees of general discomfort are some of the behavioral indicators that may be present. Humans are able to swiftly adjust both physically and behaviorally to the presence of pain, and the reaction to pain is extremely unique. It is not always true that there is no pain

if there are no physiologic or behavioral reaction to it. Acute pain is often only transitory, it comes on suddenly, and it is simple to pinpoint its origin. The discomfort is often localized to the area that was hurt and may go away with or without medical care. The wounded region will experience a shift in the sensory perception of pain, which will, in the majority of instances, reduce and eventually go away (Ignatavicious & Rebar, 2018). Acute pain is characterized by the presence of spasm of skeletal muscles and the activation of the sympathetic nervous system. It is brought on by a particular illness or injury and resolves on its own. Both the central and peripheral nervous system components of the pain transmission pathway demonstrate enormous flexibility in the process of identifying a chronic injury. This results in an enhancement of pain signals and production of hypersensitivity. It is possible for plasticity to be advantageous when defensive reflexes are favored by it; but, if the changes continue, a condition known as chronic pain may occur (Williams & Hopper, 2015).

Pain that is classified as acute occurs immediately after an injury to the body, is accompanied by an inflammatory reaction, and gradually lessens as the body begins to recover. It is frequently connected with objective, short-term bodily indicators, such as accelerated heart rate and higher blood pressure. Because of this, the physiological responses that accompany acute pain cannot be maintained for an extended period of time without causing harm to the body. Acute pain can be caused by a number of different things, including childbirth, surgery, burns, or other types of trauma. Acute discomfort that doesn't go away quickly might turn into chronic pain (Williams & Hopper, 2015).

2.6.2 Chronic pain

Chronic pain (also known as persistent pain) is discomfort that lasts or recurs for an extended amount of time, generally more than three months. The pain begins gradually and typically changes in type and quality over time. Chronic pain has no biological function. Patients and their family may experience emotional and financial strain, sadness, and pessimism as a result of chronic pain. Because the body adjusts to chronic pain, vital indicators such as blood

pressure and pulse may be lower than usual in people who suffer from chronic pain. Despite the fact that many aspects of chronic pain are identical in various people, each patient is distinct and requires a highly personalized treatment approach (Ignatavicious & Rebar, 2018). Pain that lasts for an extended period of time might be categorized as a disease state. If it is associated with a sickness or injury, it is pain that continues past the time when it should have healed. Pain that lasts for an extended period of time can be caused by psychological emotions; nonetheless, it serves no biological function and has no clear point of termination. Alterations in the characteristics of peripheral nerves can be the cause of persistent pain that is brought on by an accident or disease (such as diabetes, arthritis, or the formation of a tumor). This can happen when the nerve fibers are damaged, which can result in greater spontaneous firing or abnormalities in the neurotransmitter properties or conduction of the nerves (Świeboda et al., 2013).

Chronic pain is discomfort that lasts longer than the time it takes for the body to recover. Neck pain that persists years after an injury, and pain associated with illnesses such as arthritis, and phantom limb pain are all examples. Chronic pain patients may have both nociceptive and neuropathic components, necessitating a mix of pharmacological and nonpharmacological therapy. Patients with chronic pain may not appear to be in agony due to the body's capacity to adapt (Williams & Hopper, 2015). Chronic pain has a wide range of physical and psychological consequences. Functional impairment, anxiety, sadness, and sleep deprivation are all typical side effects. Pain interferes with daily activities and has a detrimental impact on personal connections. Chronic pain is the major cause of long-term disability and interferes with work productivity (Orr et al., 2017).

2.6.3 Cancer-related pain

Cancer patients may experience pain for a number of reasons, including the effects of cancer therapies and diagnostic procedures, compression or infiltration of neighboring body parts by a tumor, changes to the skin, nerves, and other tissues brought on by a hormone imbalance

or an immunological reaction. The majority of cases of acute pain are brought on by therapy or diagnostic procedures, but the majority of chronic pain is brought on by the underlying illness itself. Radiation, surgery, and chemotherapy can all result in painful symptoms that may last for a considerable amount of time after treatment has been completed. The presence of pain is mostly determined by where the cancer is located and how advanced the disease process is (Hanna & Zylicz, 2013). Cancer pain can be categorized as either nociceptive or neuropathic according to the pathophysiological parameters that are used to evaluate it. In addition, cancer pain frequently has a mixed pathophysiology, consisting of both nociceptive and neuropathic components. For instance, a disease that causes nociceptive pain might, over the course of time, generate secondary lesions in the somatosensory nerve system, which can result in this pain having partially neuropathic characteristics. The interplay between cancer cells, the peripheral nervous system, the central nervous system, and the immune system adds another layer of complexity to the pathophysiology of cancer pain (Caraceni & Shkodra, 2019).

2.7 Dimensions of Pain

A patient's perception of their own pain might vary greatly. The patient's own self-report is the most reliable source of information when doing an assessment. Even though it is critical to understand the patient's experience and to rely on the patient's own self-report, this perspective creates difficulties for many patients. Individuals who have dementia or who are comatose, patients who are intellectually impaired or challenged, and patients who have expressive aphasia all have varied degrees of ability to report pain, for example. In situations like these, nonverbal information, such as actions and behavior, should be incorporated into the assessment of pain. Suffering, which is a condition of emotional discomfort connected with loss, can be brought on by the mental anguish caused by physical pain. A sense of uncertainty, loss of control, and spiritual discomfort are all potential outcomes of suffering. It is necessary to analyze the ways in which the spirituality of a person both impacts and is impacted by their experience of suffering (Richardson, 2014). It is essential to understand

the significance of the suffering for the individual. For instance, a woman going through labor may endure great pain, yet she may be able to tolerate it without the use of analgesics because she associates it with a happy moment in her life. In addition, she may feel as though she has some control over her suffering as a result of the instruction received in prenatal courses and the awareness that the discomfort will eventually end. In contrast, a woman who suffers from chronic musculoskeletal pain that has not been properly diagnosed may experience increased levels of stress due to the belief that her pain is "not real," that it is beyond her control, or that it is the result of her own activities. A person's perceptions can have a significant impact on how they react to pain and should be taken into account when developing an all-encompassing therapeutic strategy. Distracting themselves from pain is one method that some individuals use to cope with it, while others try to convince themselves that the suffering is unrelenting, long-lasting, and untreatable. People who think their suffering is beyond their control and overpowering are more likely to have negative effects. The biopsychosocial model of pain takes into account not just the physiological and psychological aspects of suffering, but also its cognitive, behavioral, and social contexts (Sturgeon & Zautra, 2013).

Table 2.1 Dimensions of pain (Lewis et al., 2016).

Dimension	Description
Physiologic	<ul style="list-style-type: none"> • Genetic, anatomic, and physical determinants of pain influence how painful stimuli are processed, recognized, and described.
Affective	<ul style="list-style-type: none"> • Emotional responses to pain include anger, fear, depression, and anxiety. • Negative emotions impair the patient's quality of life.

Cognitive	<ul style="list-style-type: none"> • Beliefs, attitudes, memories, and meaning attributed to pain influence the ways in which a person responds to pain.
Behavior	<ul style="list-style-type: none"> • Observable actions (e.g., grimacing, irritability, coping skills) are used to express or control pain. • People unable to communicate may have behavioral changes (e.g., agitation, combativeness).
Sociocultural	<ul style="list-style-type: none"> • Age and gender influence nociceptive processes and responses to opioids. • Families and caregivers influence the patient's response to pain through their beliefs, behaviors, and support. • Culture affects pain expression, medication use, and pain-related beliefs and coping methods.

2.8 Pain Assessment

The extremely subjective character of pain creates difficulties in both the assessment and management of the condition. Nevertheless, the patient's own account serves as the gold standard for determining whether or not there is pain and how severe it is. Patients' perceptions of the existence and severity of their own pain are often regarded as the most accurate indicator of these factors. It might be challenging to take the patient's account of pain seriously and take appropriate action (Hinkle & Cheever, 2018). The aims of nursing pain assessments are to characterize the patient's affective, behavioral, sensory, and sociocultural pain experiences in order to adopt pain management measures, as well as to determine the patient's therapeutic goals and resources and strategies for effective self-management. The sections that follow cover major aspects of pain evaluation (Harding et al., 2019).

2.8.1 Pain pattern

Assessing the beginning of pain entails establishing when the pain began and how long it has persisted. Patients suffering from acute pain as a consequence of an injury, sickness, or therapy usually know when their discomfort began. Those suffering from chronic pain may have a more difficult time determining when the symptoms began. The pain pattern also indicates the source of the discomfort and guides therapy. Many kinds of chronic pain can fluctuate in intensity over time. A patient may experience continuous pain as well as occasional discomfort. Breakthrough pain (BTP) is a transitory, moderate-to-severe pain that occurs in people with mild-to-moderate chronic pain that is otherwise adequately managed. The typical BTP peak lasts 3 to 5 minutes and can last up to 30 minutes or more. Patients may experience one or more episodes each day (Lewis et al., 2016).

2.8.2 Pain location

Finding out where the pain is coming from is a helpful step in figuring out probable causes and treatments. There are some patients who are able to pinpoint the exact place (or locations) of their discomfort. Others may mention that they "hurt all over" or describe more generalized regions of discomfort. There is a possibility that the pain might be redirected from its source to another region. A myocardial infarction, for instance, might cause discomfort in the shoulder on the left side of the body. The source of the pain might sometimes be felt at a different location. Angina pectoris, for instance, might cause pain in the jaw or down the left arm, and it can originate in the chest. This type of discomfort is referred to as radiating pain (Harding et al., 2019).

2.8.3 Intensity of pain

A trustworthy measurement that may be used for deciding the sort of treatment to be administered as well as for establishing whether or not the therapy is successful is an

evaluation of the intensity of the pain being experienced. Pain scales are helpful tools that allow patients to describe the level of their discomfort and can also be used to direct therapy. Most adults are able to assess the intensity of their pain using numerical scales (for example, 0 = "no pain" and 10 = "the worst pain"), verbal descriptor scales (for example, none, a little [1-3], moderate [4-6], and severe [7-10]), or visual analog scales (a 10-cm line with one end labelled "no pain" and the other end labelled "worst possible pain"). A set of expressions that range from "smiling" to "weeping" can be utilized for individuals who are unable to respond to other pain severity ratings. The applicability of these scales to a wide range of patient groups, including younger children and older individuals, has been examined. Based on the outcomes, it appears that they offer genuine and trustworthy evaluation data (Lewis et al., 2018).

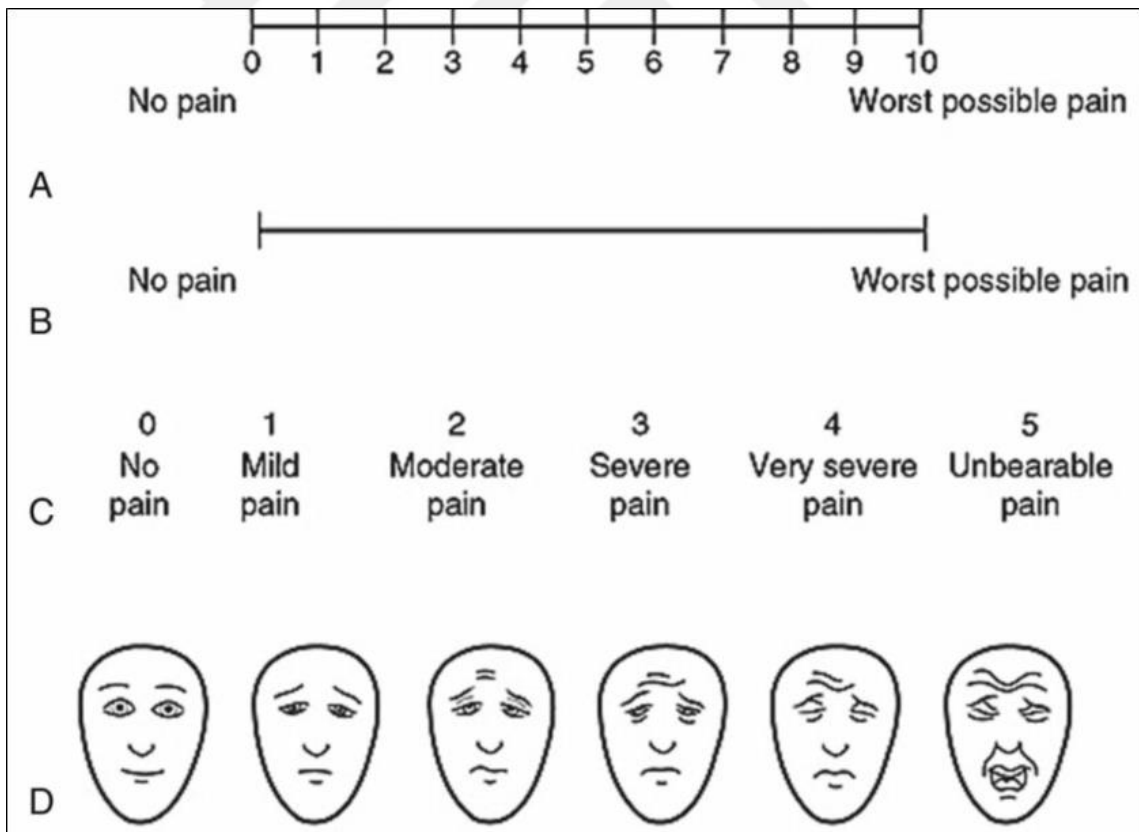


Figure 2.4 Pain intensity scales. A, 0 to 10 numeric scale. B, Visual analog scale. C, Descriptive scale. D, Faces Pain Scale. (Harding et al., 2019).

2.8.4 Quality of pain

The term "pain quality" refers to the features of the ache or discomfort that a person is experiencing. Patients frequently use terms such as "burning," "numbing," "shooting," "stabbing," "electric shock-like," or "itchy" to describe sensations associated with neuropathic pain. Pain that is caused by nociceptors might be described as sharp, cramping, dull, throbbing, and aching (Harding et al., 2019).

2.8.5 Associated symptoms

Anxiety, weariness, and sadness are among symptoms that can increase or be exacerbated by pain. Patients who are in pain frequently complain of poor sleep and drowsiness during the day. Sleep deprivation can exacerbate pain perception. It is important to determine the things that aggravate pain, as well as the activities and settings that help to relieve it (Lewis et al., 2016).

2.8.6 Pain management strategies

When people are exposed to and live with pain, their coping mechanisms may change, and they may become more or less inclined to experiment with a variety of techniques to alleviate it. Some approaches are fruitful, while others do not produce the desired results. It is interesting to note about the strategies that patients now utilize to control their pain, as well as the methods that they have used in the past and the results that these treatments produced. The use of prescription medications, over-the-counter medications, and non-drug therapies, such as applying cold and heat, participating in alternative and complementary therapies (like acupuncture), and practicing relaxation techniques are all examples of tactics (e.g., imagery). It is essential to keep records of those strategies that are successful and those that are not (Lewis et al., 2018).

2.8.7 Impact of pain

When treating a patient who is experiencing acute pain, it is important to do regular assessments to determine how the patient's level of discomfort impacts their capacity to engage in rehabilitation activities. It is of utmost importance to inquire of patients with persistent pain how the pain has impacted their life and what activities they want to participate in but are unable to because of the discomfort (Hinkle & Cheever, 2018).

2.9 Pain Management

The efficient management of pain can be accomplished through the use of a wide variety of therapies, both pharmacological and nonpharmacological. Analgesics are a class of medications that are used to treat pain. Analgesics are the most important part of pain management, and they include three primary categories of medication: opioids, nonopioids, and adjuvants. Opioids are the most common type of analgesic. Opioids block opioid receptors in the brain, spinal cord, as well as other parts of the body, which in turn blocks the brain's ability to register pain. NSAIDs, often known as nonsteroidal anti-inflammatory medicines, and acetaminophen are examples of nonopioid medications. Adjuvants are distinct from both opioids and nonopioids due to the fact that they include categories of drugs that serve functions in addition to the management of pain (such as depression). In order to adequately control pain, some individuals may require a mix of NSAIDs, opioids, and adjuvants (Williams & Hopper, 2015).

2.9.1 Pharmacological methods

Nonopioids, opioids, and adjuvant medicines are the three primary classifications of pain treatment medication. Medication from one or more of these categories may be included in treatment plans that are centered on the patient. When used alone, nonopioids are frequently sufficient to alleviate moderate pain. Opioids are typically necessary for treating moderate to

severe pain. Adjuvant medication therapy may be necessary for the treatment of some forms of pain, such as neuropathic pain, either on its own or in conjunction with an opioid or other type of analgesic. Chemotherapy and radiation therapy, in addition to pain medication, are potential treatments for pain that is produced by cancer (Hinkle & Cheever, 2018).

2.9.1.1 Nonopioid drugs

When treating moderate pain, nonopioids are often the first type of medication that is attempted. They have the potential to be effective treatments for acute as well as chronic pain resulting from a wide range of conditions, including cancer, trauma, arthritis, and surgery. Because these medicines have maximum analgesic effect, the range of situations in which they can be used is restricted. Beyond this level, there is no improvement in the analgesic effect, and there may be an increase in side effects if the dose is increased any more. This phenomenon is known as the ceiling effect. When used in conjunction with opioids, extreme caution is required to ensure that the nonopioid dose does not exceed the utmost permissible amount for a period of 24 hours. Tolerance and physical dependency are not created by nonopioid substances. The majority do have temperature-lowering properties. In contrast to opioids, nonopioids mostly exert their analgesic effects locally, at the site of the injury, instead of on the central nervous system. Acetaminophen is considered to be an exception to this category since it is thought to affect the central nervous system. Prostaglandins are one of the numerous molecules that are necessary for pain transmission. NSAIDs prevent the production of prostaglandins (Williams & Hopper, 2015). Analgesics that do not contain opioids include things like aspirin, several other salicylates, NSAIDs, and acetaminophen. These substances are distinguished by the analgesic characteristics that they possess. They have maximum analgesic effect, meaning that raising the dose above a predetermined upper limit does not result in more pain relief. Additionally, they do not result in tolerance or physical dependency in the user. Pain that is mild to moderate can be effectively treated with nonopioid medications. They enable adequate pain relief to be achieved by utilizing lower opioid dosages, which is why they are frequently used in combination with opioids. Because

of this, aspirin is an effective treatment for minor pain; nevertheless, its usage is restricted because of typical adverse effects, which include an increased risk of bleeding, particularly gastrointestinal (GI) bleeding. Other salicylates, including choline magnesium trisalicylate, also known as Trilisate, are associated with fewer gastrointestinal (GI) problems and bleeding irregularities (Lewis et al., 2016).

The non-opioid medicine that is most commonly used is paracetamol (acetaminophen). It is common knowledge that paracetamol inhibits the production of prostaglandins. The precise mechanism by which paracetamol exerts its effects is still the subject of debate. It is true that paracetamol is an efficient analgesic; nevertheless, the drug's analgesic effects often do not last for longer than four hours, which means it cannot be used to treat pain that is ongoing. In spite of the fact that it is virtually risk-free, even at low dosages paracetamol can induce failure of the liver (Nair & Peate, 2013).

2.9.1.2 Opioid drugs

Opioids are divided into several classes based on their physiological effect (i.e. agonist, antagonist) and their ability to bind to particular opioid receptors (e.g., mu, kappa, delta). Pure opioid agonists, often known as morphine-like opioids, are the subclass of opioids that are most frequently used clinically. These opioids bind to mu receptors. Acute as well as chronic pain can be treated with opioid agonists. Despite the fact that opioids tend to be more effective at treating nociceptive pain than neuropathic pain, it is still possible to utilize opioids to treat both types of pain. Antidepressants and antiseizure medications are indicated for use as first-line treatments for the treatment of neuropathic pain. Other anti-neuropathic pain medications include anticonvulsants. Morphine, oxycodone, hydrocodone, codeine, methadone, and hydromorphone are all examples of pure opioid agonists. These medications are useful for treating moderate to severe pain because of their potency, they have no analgesic ceiling in theory, and they may be taken in a variety of ways. When opioids are recommended to treat moderate pain, they are almost always coupled with another analgesic

that is not an opioid, such as acetaminophen. The maximum total daily dose that can be administered is reduced when acetaminophen or NSAIDs are taken simultaneously (Lewis et al., 2016). Nausea, vomiting, constipation, drowsiness, pruritus, and respiratory depression are some common adverse effects that might occur when using opioids. Constipation is the one adverse effect that does not improve with continuing use of the medication. Urinary retention, myoclonus, dizziness, disorientation, and hallucinations are some of the less prevalent adverse effects of this medication. In opioid-naive hospitalized patients who have been treated for acute pain, the likelihood of experiencing respiratory depression is significantly increased. Within the first twenty-four hours following surgery, postoperative patients are at highest risk for experiencing respiratory adverse effects that are connected to opioids. Clinically substantial respiratory depression cannot develop in fully conscious people (Harding et al., 2019). Opioids typically function as agonists at the opioid receptor. They are classed either as weak (low potency) or strong (high potency) based on their intrinsic activity at the receptor (Binder & Baron, 2016).

Table 2.2 Common strong opiates and their routes of delivery (Nair & Peate, 2013)

Drugs	Prescription	Route
Morphine	Morphine	Injection Suppository
	Oramorph®	Oral – liquid, tablet
	Sevredol®	Oral – tablet
	MST Continus®	Oral – tablet, suspension
Diamorphine	Diamorphine	Oral – tablet Injection
Oxycodone	Oxynorm®	Oral – tablet, liquid
	Oxycontin®	Injection Oral – tablet
Fentanyl	Fentanyl Durogesic	Patch, Injection
	DTrans®	Patch
Pethidine	Pethidine	Oral – tablets
	Pamergan P100®	Injection

Table 2.3 Common weak opiates and their routes of delivery (Nair & Peate, 2013).

Drugs	Prescription	Route
Codeine	Codeine phosphate Co-codamol (Paracodol®) Codeine phosphate 8 mg or 30 mg with 500 mg paracetamol Co-codaprin® Codeine phosphate 8 mg with 400 mg aspirin	Oral – tablet, syrup Injection (controlled drug) Oral – capsule and dispersible tablets Oral – dispersible tablets
Dihydrocodeine	Dihydrocodeine (DF118®) Co-dyramol Dihydrocodeine 10 mg with 500 mg paracetamol	Oral – tablet Injection (controlled drug) Oral – tablet
Tramadol	Tramadol (Zydol®) Tramacet® Tramadol 37.5 mg with 325 mg paracetamol	Oral – capsule Injection Oral – tablet

2.9.1.2.1 Equianalgesic dose

A dosage of one analgesic that delivers pain-relieving effects comparable to those of another analgesic is referred to as an equianalgesic dose. When switching from one analgesic to another if a specific medicine is ineffective or causes unacceptable side effects, as well as when switching the method of administration of opioids (e.g., from parenteral to oral), the idea of equivalency is a crucial one to keep in mind. It is vital to be aware that opioids are typically provided at dosages that are equivalent in terms of their analgesic effect. This is

because no upper dosage limit has been identified for the majority of these medicines. The doses of many popular equianalgesics are compared in Table 10-8 with 10 milligrams of parenteral morphine, which is the typical foundation for comparison (Lewis et al., 2018).

Table 2.4 : Equianalgesic dose (Lewis et al., 2018).

Drug	Approximate Equianalgesic Parenteral Dosage	Approximate Equianalgesic Oral Dosage
Morphine	10 mg	30 mg
Hydromorphone (Dilaudid)	4 mg	2 mg
Oxycodone	Not available	20 mg
Codeine	120 mg	200 mg
Meperidine (Demerol)	75 mg	300 mg

2.9.1.3 Adjuvant drugs

The term "adjuvant analgesics" refers to a varied range of painkillers that were first created for a primary reason not associated with pain. A significant number of these pharmaceuticals are now being utilized to improve analgesia in a variety of settings. It is interesting to note that some of these medicines are now utilized as the main analgesics for certain types of pain issues, while others are used as adjuvants for other types of pain conditions. One of the most important aspects of successful pain treatment is making sure that adjuvant medications are used in the right way. Because adjuvant analgesics are often given to patients who are already taking many drugs, decisions about administration and dose need to be made with a thorough comprehension of the stage the disease has reached and the objectives of treatment. Due to the fact that adjuvants create their own adverse effects, it is best to use them in situations in

which a patient is unable to achieve acceptable pain relief with a main pain medicine (such as acetaminophen, nonsteroidal anti-inflammatory drugs, or opioids) (Knotkova & Pappagallo, 2007). It is possible for some kinds of drugs, known as adjuvants, to enhance the analgesic effects of opioids or nonopioids, to have analgesic action in and of themselves, or to mitigate the adverse effects of other types of analgesics. When treating pain that does not react well to standard analgesics alone, adjuvants are essential as a kind of treatment. Examples of adjuvants are corticosteroids, anticonvulsants, antidepressants, and benzodiazepines (Williams & Hopper, 2015).

2.9.2 Non-pharmacological methods

Treatments that do not involve the use of drugs are often categorized as either cognitive-behavioral therapies or physical agents. The objectives of these two categories of therapy are not the same. Cognitive-behavioral therapies can assist patients in comprehending and coping with their pain, as well as actively participating in the evaluation and management of their discomfort. The provision of comfort, correction of physical dysfunction, modification of physiological reactions, and reduction of anxiety that may be linked with immobility are all potential objectives that may be pursued with physical agents. It is not reasonable to expect nondrug therapies to alleviate pain on their own; thus, they should be used in combination with drug therapy (Williams & Hopper, 2015).

2.9.2.1 Physical agents

A patient's perception of personal control over the management of pain and their ability to cope with it are both increased by the use of physical agents. It is believed that some drugs can either change the input of ascending nociceptors or trigger descending pain modulation processes. These drug-free treatments are beneficial for treating acute as well as chronic pain (Harding et al., 2019).

2.9.2.1.1 Cold therapy

A non-pharmaceutical approach that is simple, inexpensive, and very successful in reducing acute inflammatory pain is cryotherapy, which involves the application of cold to the tissues. It is possible for cold treatment to be even more effective when paired with compression. During the acute phase of tissue injury, such as soon after surgery, exercise, or trauma, cold therapy is advised as an effective treatment option. Numerous studies demonstrated that cold therapy is effective at reducing pain. As a result of lower concentrations of inflammatory mediators, peripheral nociceptors, which are responsible for pain feeling, are less likely to be irritated. The conduction velocity of peripheral sensory nerves is also slowed down by cold treatment, which inhibits the transfer of pain signals to the dorsal horn of the spinal cord. It's also possible that cold can operate as a counterirritant by activating central pain pathways, which can subsequently activate descending inhibitory pathways and prevent pain from being transmitted to the brain (Corti, 2014).

2.9.2.1.2 Heat therapy

Heat is widely regarded as one of the simplest ways to treat muscle spasms and develop joint mobility at the present time. When administered to a painful location, heat raises the temperature of the muscle, enhances circulation, produces muscular relaxation, and reduces inflammation; all of these effects contribute to the stimulation of analgesia. Packs or wraps, either dry or moist, can be used to apply heat, as can soaking in a warm bath or utilizing a whirlpool. Heat should be avoided in situations when application might make things worse, such as in an area where there has been trauma. Patients who suffer from muscle spasms and back pain are good candidates for the application of heat, as are those who have pain as a result of arthritis, past trauma, or joint stiffness (Adams & Arminio, 2008).

2.9.2.1.3 Exercise

The stimulation of descending inhibitory systems, the increase in endogenous opioids, and altered serotonin activity are major mechanisms involved in the production of analgesia by exercise. On a mechanistic level, frequent exercise lowers central excitability as well as the expression of excitatory neurotransmitters in the nociceptive regions of the spinal cord, brain stem, and the cortex. In the serotonergic system, greater analgesia is caused by reduced expression of the serotonin transporter and increased release of the neurotransmitter serotonin in the rostral ventromedial medulla. Both of these processes take place in the brain's rostral ventromedial medulla. In addition to this, regular exercise lessens the activation of glial cells, boosts the production of anti-inflammatory cytokines in the spinal cord, and decreases the production of inflammatory cytokines. Regular exercise can reduce pain sensitivity by modifying central nociceptive processing and enhancing central inhibition (Chimenti et al., 2018).

2.9.2.1.4 Transcutaneous electrical nerve stimulation (TENS)

The transcutaneous electrical nerve stimulation (TENS) technique is a strategy for managing acute and chronic pain that is noninvasive, affordable, safe, and easy to use. TENS was demonstrated to be helpful in the therapy of a wide variety of chronic pain syndromes, including neuropathic pain, cancer pain, and myofascial pain, among others. The strength of the therapy is based on the patient's reaction, which might be on either the sensory or motor level. TENS is delivered at varied frequencies of stimulation. TENS can help patients suffering from both acute and chronic pain in a variety of patient demographics. It is suggested for use in the treatment of pain associated with surgical procedures, musculoskeletal discomfort, and neuropathic pain. It is important to remember that transcutaneous electrical nerve stimulation (TENS) by itself cannot completely block pain, but that it is still a useful supplementary therapy (Adams & Arminio, 2008).

2.9.2.1.5 Massage

Massage is the process of manipulating soft tissue by applying pressure and a variety of different methods, which vary according to the tissue interface that is being addressed. Circulation, muscles, connective tissue, autonomic nervous system, as well as sensations of pain and discomfort are all affected by massage. Massage helps decrease edema and muscle spasms, and it also has the potential to alleviate pain by interrupting the cycle of pain and muscle spasms (American Nurses Association 2016). Both acute and chronic pain might benefit from massage therapy. There are many types of massage techniques, some of which include gliding the fingers or hands over the skin slowly or quickly with lengthy strokes or in circles (superficial massage), or exerting firm pressure on the skin in order to maintain touch while massaging the deeper tissues (deep massage). There's also something called a trigger point massage. A trigger point is a hypersensitive region that is confined inside a band of muscle that is particularly taut. Muscle strain, either acute or chronic, is what leads to this condition. It gives the impression of a tight knot under the skin. When doing trigger point massage, strong, deep massage, continuous digital pressure, or a softer massage with ice following by muscle heating are some of the techniques that can be used (Harding et al., 2019).

2.9.2.2 Psychological therapies (cognitive-behavioral interventions)

Both the intensity of a person's experience of pain and the response they have to therapy are heavily influenced by psychological variables. As a result, it is imperative that all patients suffering from chronic pain have access to expert psychiatric assistance, as this might impact the emotional component of the condition. Cognitive therapy, behavioral therapy, relaxation techniques, and hypnotherapy are the four psychological approaches that are utilized most frequently in the treatment of chronic pain. Each of these approaches has the potential to be effective as a technique supporting the treatment of chronic pain (Świeboda et al., 2013).

2.9.2.2.1 Hypnosis

Hypnosis is a common psychological method for pain treatment that includes relaxation, focused attention, and targeted verbal suggestion to change perceptual behavior and experience. Hypnosis is simple to use and has few, if any, negative effects. Hypnotic suggestion causes changes in activity in major pain-regulating areas of the brain, such as the anterior cingulate, insular cortices, and prefrontal region, which might be the foundation for analgesic effects (Thompson et al., 2019).

2.9.2.2.2 Relaxation

There are many different approaches one might take in order to unwind and calm down. The patient may have a preference for a relaxation exercise that includes a script which can be practiced and utilized in the same way each time, or the patient may simply prefer the use of a favorite piece of music that allows for a state of muscular relaxation and freedom from worry. Through the use of the patient's imagination, guided imagery can transport the patient from the source of their discomfort to a location of their choosing, such as a beach. The effectiveness of guided imagery does not in any way imply that the patient is exaggerating or making up their suffering (Williams & Hopper, 2015).

3. METHODOLOGY

3.1 Research Design

In order to accomplish the goals outlined in the beginning of the research, a cross-sectional study with descriptive-analytical design was carried out. The dates covered by the study were 20th of December, 2021 through 16th of April, 2022.

3.2 Study Setting

The research was carried out at teaching hospitals including Al-Sadr teaching hospital, Al-Furat teaching hospital, and Al-Hakeem teaching hospital. These three hospitals are located in Al-Najaf, which is about 160 kilometers south of Baghdad the capital city of Iraq. Nurses who work in the medical wards, surgical wards, emergency rooms, and critical care units were chosen to participate in the present study.

3.3 Study Sample

Nurses (male and female) who were working in the emergency department, surgical ward, medical ward, and critical care unit at each hospital were asked to participate in this study (Al-Sadr teaching hospital, Al-Furat teaching hospital, and Al-Hakeem teaching hospital) using a non-probability sampling method called a purposive sample. There were 216 nurses in total. These wards were purposefully chosen since the nurses who work there frequently deal with pain management.

3.3.1 Sample Size

The sample size was calculated according to the table provided by Krejcie & Morgan (1970). This is a readily used table for determining sample size according to population size. In the current study, the total population size of nurses in the included hospitals was 491, so the corresponding sample size should be 216. The sample size for each hospital was determined according to their proportion in the total population size, which is as follows :

Table 3.1 Calculation of sample sizes for the hospitals included in the study

Hospital	Population Size	Proportion	Sample size
Al-Hakeem	137	35%	76
Al-Sadr	202	41%	88
A-Forat Al-Awsat	116	24%	52
Total	491	100%	216

The sample size was determined using the Steven Thompson equation. From the following formula:

$$n = N * P(1-P) / [(N-1) * (d^2 / Z^2) + P(1-P)]$$

n = sample size

N = population size = 491

Z = confidence level at 95% (1.96)

d = error proportion (0.05)

p = probability (0.5)

The sample was calculated by applying the Steven Thompson equation with d: error proportion (0.05), Z: Confidence level 95% (1.96), p: probability (0.5), and N: population size of nurses (491). The result was 215.52, which approximated to 216. The value of the sample size was n:216.

3.3.2 Criteria for inclusion in the sample

The sample included nurses who agreed to participate in the study at each teaching hospital and who worked in the emergency room, surgical department, medical ward, and intensive care unit. These wards were selected purposively as the nurses working in these areas deal with pain management more often. The study included nurses of both sexes, male and female, of all ages and all educational levels, regardless of years of experience.

3.3.3 Criteria for exclusion from the sample

The data was gathered through a personal interview with the researcher (questionnaire). Incomplete data was verified on all returned surveys. Questionnaires that were left blank or only partially completed were disqualified. Also, nurses who refused to participate in the study were excluded.

3.4 Study Instrument

The researcher utilized a questionnaire to fulfill the goals of the study, which were to assess knowledge and attitudes of nurses working at teaching hospitals in Al-Najaf about pain management. This research tool is divided into two sections (Appendix 1):

3.4.1 Form I: Demographic characteristic form

Nurse data was collected using a data collection sheet (DDS). The DDS contained demographic questions such as gender, age, workplace, educational level, previous training courses on pain management, and number of clinical experience years to obtain information regarding participants' (nurses) demographic features.

3.4.2 Form II: Nurse knowledge and attitude about pain management.

The research instrument was the self-administered “Nurses' Knowledge and Attitudes Survey Regarding Pain” (KASRP-N). The KASRP-N is a 39-item questionnaire developed by Ferrell & McCaffery (1987) to assess nurses’ knowledge and attitudes toward pain management. It has undergone revisions to reflect current trends in practice and was last revised in 2012 (Ferrell & McCaffery, 2012). It consist of 39 questions, including 22 true/false, 15 multiple choice questions, and two scenarios. The content validity of KASRP-N was established by a panel of pain experts. The KASRP-N content was based on the pain management guidelines of the American Pain Society, WHO, and the Agency for Health Care Policy and Research. Test-retest reliability was established ($r > 0.80$). Internal consistency reliability was established ($\alpha r > 0.70$) (Salim et al., 2020). The researcher (Salim) was granted permission by email to use the tool (Salim et al., 2020).

3.5. Rating and Scoring

The items were rated and scored according to the following patterns: true/false and multiple-choice questions; each question consists of four options. One option is true, and the three remaining options are false. The correct answer is scored 1, and the incorrect answer is scored 0.

3.6 Validity and Reliability of the Study Instrument

In the United Arab Emirates, a study conducted by Salim et al. (2020) used the tool (KASRP) to achieve the goals of their study. The content validity of KASRP was established by a panel of pain experts. KASRP content was based on pain management guidelines of the American Pain Society, WHO, and the Agency for Health Care Policy and Research. Test-retest reliability was established ($r > 0.80$). Internal consistency reliability was established ($\alpha > 0.70$) (Salim et al., 2020). The researcher (Salim) granted email permission to use the tool, and sent it in Arabic language format (Salim et al., 2020). In the current study, the tool was used in the Arabic language so that nurses could understand and answer questions in Arabic.

3.8 Data Collection

After receiving all necessary official approval to ensure the consent of and cooperation from nurses during the data collection process, face-to-face interviews with nurses were conducted by the researcher prior to the data collection phase. During these interviews, the goal of the current study was explained to the nurse participants, and verbal agreement to participate in the present study was gained on a voluntary basis. The researcher handed out questionnaires to nurses working in the medical ward, surgery ward, emergency department, and critical care unit of each hospital invited to take part in this study. Later, the participants' responses to the questionnaires were collected. The completeness of the data was checked for every questionnaire that was received. Questionnaires with blank responses or that were only partially filled out were not considered. The procedure for gathering information took place between the 20th of December, 2021, and 16th of April, 2022.

3.9 Data Analysis

Data for the sample were input and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Analysis included two types of statistics presented as mean, frequencies and percentages. All continuous variables were tested for normal statistical distribution using bar charts and normal distribution curve. Statistical tests were applied according to the distribution and type of variable. The chi-square test was used to compare frequencies. Bivariate Pearson's correlation test was used to assess the correlations. Correlation coefficient (r) is an indicator of the strength and direction of correlations, the value ranges from zero (no correlation) to one (perfect correlation). Higher r values close to one indicate stronger correlation, while a positive r value indicates a direct (positive) correlation and negative r value indicates inverse correlation. Level of significance of ≤ 0.05 was considered as significant difference or correlation.

3.10 Ethics Committee Approval

This is one of the most essential issues in nursing research to preserve the principles of ethics before collecting data; the goal is to insure the rights of the researcher and participants. The researcher ensured that ethical procedures were met in accordance with the Belmont Report, which includes ethical principles and standards for the protection of human subjects in research. This report was developed and released in 1978 by the National Commission for the Preservation of Human Subjects of Biomedical and Behavioral Research (Sims, 2010). The study proposal was accepted, and Cankiri Karatekin University Scientific Research Evaluation Ethics Committee (in Turkey) granted ethical approval (Ethics committee decision number 24 dated 07.02.2022) (Appendix 2). In addition, the research was approved by the Scientific Research Evaluation Ethical Committee in the Iraqi Ministry of Health/Al-Najaf Health Directorate by an administrative order directed to general teaching hospitals (Alsadr teaching hospital, Al-Furat teaching hospital, and Al-Hakeem teaching hospital) (Appendix 3).

Prior to data collection, one of the most fundamental criteria is to ensure that the participant's values and dignity are preserved. After the researcher explained the goal of the study to the participants and sought their informed consent, the researcher next obtained the participant's personal approval in order to conduct an interview. The researcher ensured that the participants' privacy would be protected at all times, and they were given the option to respond to the questionnaire on their own time and at their own discretion without disrupting their normal routines. The researcher made a commitment to maintain participant confidentiality and to use this data only for the purposes of the study.



4. RESULTS

Table 4.1 Descriptive statistics; frequency and percentage for nurses' demographic data

Demographic data	Sub-groups	n (216)	%
Age / years 28.55±5.75	20 – 29	135	62.5
	30 – 39	68	31.5
	40 – 49	13	6.0
Gender	Male	99	45.8
	Female	117	54.2
Educational Level	Nursing Preparatory	27	12.5
	Diploma in nursing	75	34.7
	B.Sc. in Nursing	84	38.9
	M.Sc. in Nursing	30	13.9
Years of Experience 6.44±5.47	1-10	181	83.8
	11-20	25	11.6
	21-30	10	4.6
Current Workplace	Emergency Room	91	42.1
	ICU	48	22.2
	Medical Ward	38	17.6
	Surgical Ward	39	18.1
Pain Management Training Course	No	116	53.7
	Yes	100	46.3

The demographic data for nurses are presented in the table (4.1). This table shows that the majority of the nurses had ages ranging between (20-29) years (62.5%); were female (54.2%); had a B.Sc. nursing degree (38.9%); had between 1-10 years of experience (83.8%); worked in emergency rooms (42.1%); and had received no training courses about pain management (53.7%).

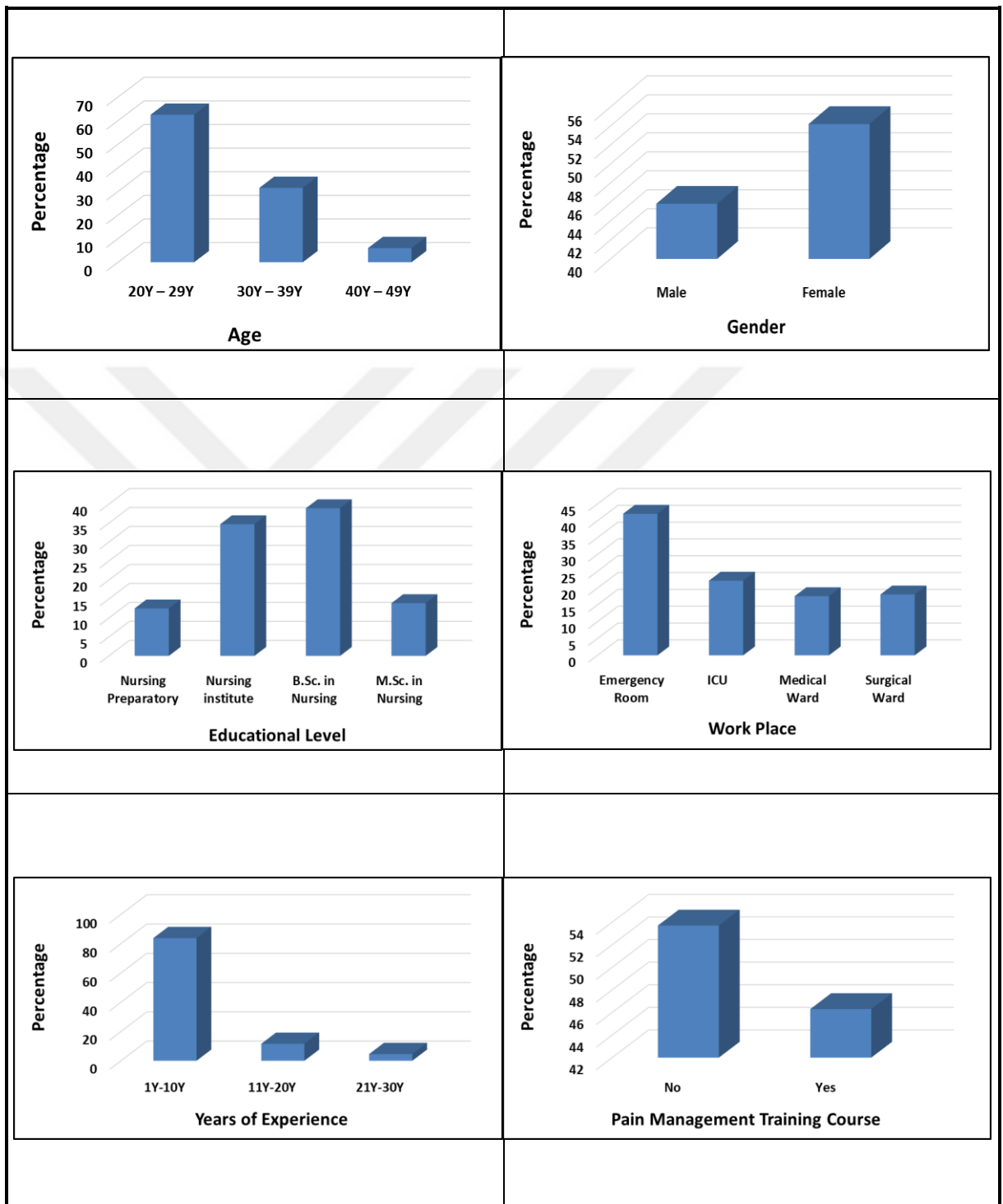


Figure 4.1 Bar-chart for descriptive statistics; frequency and percentage for the nurses' demographic data

Table 4.2 Assessment and mean of scores for nurses' knowledge and attitude regarding pain management.

MS: Mean Scores; **SD:** Standard Deviation ; (**Poor:** MS = 0-0.33 ; **Moderate:** MS =0.34-0.66 ; **Good:** MS≥0.67)

No.	Items	N	%	MS	SD	Assess.
1	Incorrect	152	70.4	0.30	0.46	Poor
	Correct	64	29.6			
2	Incorrect	142	65.7	0.34	0.47	Moderate
	Correct	74	34.3			
3	Incorrect	154	71.3	0.29	0.45	Poor
	Correct	62	28.7			
4	Incorrect	102	47.2	0.53	0.50	Moderate
	Correct	114	52.8			
5	Incorrect	128	59.3	0.41	0.49	Moderate
	Correct	88	40.7			
6	Incorrect	54	25.0	0.75	0.43	Good
	Correct	162	75.0			
7	Incorrect	105	48.6	0.51	0.50	Moderate
	Correct	111	51.4			
8	Incorrect	113	52.3	0.48	0.50	Moderate
	Correct	103	47.7			
9	Incorrect	151	69.9	0.30	0.46	Poor
	Correct	65	30.1			
10	Incorrect	106	49.1	0.51	0.50	Moderate
	Correct	110	50.9			
11	Incorrect	136	63.0	0.37	0.48	Moderate
	Correct	80	37.0			
12	Incorrect	122	56.5	0.44	0.50	Moderate
	Correct	94	43.5			
13	Incorrect	45	20.8	0.79	0.41	Good
	Correct	171	79.2			
14	Incorrect	39	18.1	0.82	0.38	Good
	Correct	177	81.9			

15	Incorrect	137	63.4	0.37	0.48	Moderate
	Correct	79	36.6			
16	Incorrect	89	41.2	0.59	0.49	Moderate
	Correct	127	58.8			
17	Incorrect	139	64.4	0.36	0.48	Moderate
	Correct	77	35.6			
18	Incorrect	134	62.0	0.38	0.49	Moderate
	Correct	82	38.0			
19	Incorrect	78	36.1	0.64	0.48	Moderate
	Correct	138	63.9			
20	Incorrect	41	19.0	0.81	0.39	Good
	Correct	175	81.0			
21	Incorrect	33	15.3	0.85	0.36	Good
	Correct	183	84.7			
22	Incorrect	49	22.7	0.77	0.42	Good
	Correct	167	77.3			
23	Incorrect	163	75.5	0.25	0.43	Poor
	Correct	53	24.5			
24	Incorrect	30	13.9	0.86	0.35	Good
	Correct	186	86.1			
25	Incorrect	109	50.5	0.50	0.50	Moderate
	Correct	107	49.5			
26	Incorrect	109	50.5	0.50	0.50	Moderate
	Correct	107	49.5			
27	Incorrect	133	61.6	0.38	0.49	Moderate
	Correct	83	38.4			
28	Incorrect	144	66.7	0.33	0.47	Poor
	Correct	72	33.3			
29	Incorrect	116	53.7	0.46	0.50	Moderate
	Correct	100	46.3			
30	Incorrect	88	40.7	0.59	0.49	Moderate
	Correct	128	59.3			
31	Incorrect	89	41.2	0.59	0.49	Moderate
	Correct	127	58.8			
32	Incorrect	76	35.2	0.65	0.48	Moderate

		Correct	140	64.8			
33		Incorrect	99	45.8	0.54	0.50	Moderate
		Correct	117	54.2			
34		Incorrect	101	46.8	0.53	0.50	Moderate
		Correct	115	53.2			
35		Incorrect	132	61.1	0.39	0.49	Moderate
		Correct	84	38.9			
36		Incorrect	177	81.9	0.18	0.38	Poor
		Correct	39	18.1			
37		Incorrect	115	53.2	0.47	0.50	Moderate
		Correct	101	46.8			
38A		Incorrect	132	61.1	0.43	0.71	Moderate
		Correct	84	38.9			
38B		Incorrect	152	70.4	0.30	0.46	Poor
		Correct	64	29.6			
39A		Incorrect	117	54.2	0.46	0.50	Moderate
		Correct	99	45.8			
39B		Incorrect	148	68.5	0.31	0.46	Moderate
		Correct	68	31.5			
Total knowledge and attitude about pain management					0.50	0.47	Moderate

Table 4.2 shows the assessment and mean scores for nurses' knowledge and attitude about pain management. This table shows that the nurses have moderate knowledge and attitude regarding most questions about pain management, exhibited good knowledge and attitude for some items, and had poor knowledge and attitude about a few other items. The overall total knowledge and attitude was moderate. This assessment is based on the statistical scoring system, in which the item was classified as poor if the mean scores were between 0-0.33; scores were considered moderate if the mean scores were between 0.34-0.66; while it was considered good if the mean scores were more than 0.67.

Table 4.3 Frequency and percentage according to nurse knowledge and attitude about pain management

Statistics	Knowledge and Attitude Levels		
	Poor	Moderate	Good
Frequency	21	186	9
Percentage	9.72	86.11	4.17

This table exhibits the descriptive statistics for nurses' knowledge and attitudes about pain management. It shows that about 9.72% of the nurses had poor knowledge and attitude, 86.11% of them had moderate knowledge and attitude, and 4.17% had good knowledge and attitude (Table 4.3 and Figure 4.1).

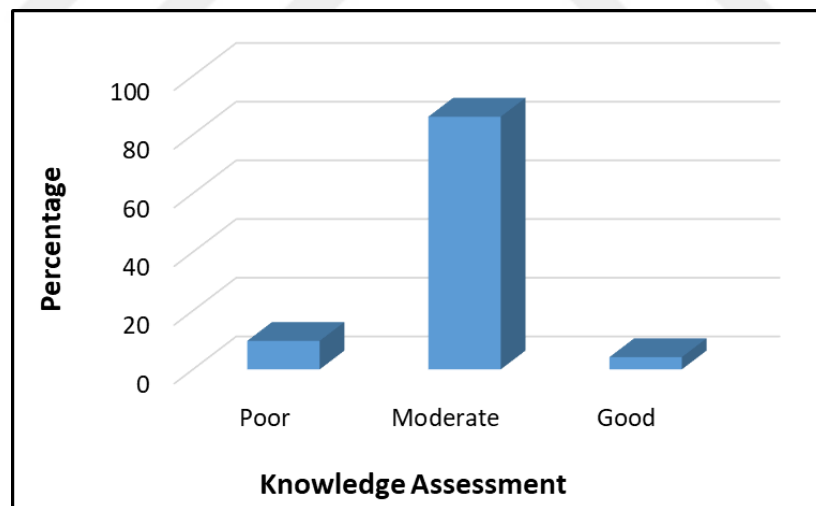


Figure 4.2 Frequency and percentage according to nurse knowledge and attitudes about pain management

Table 4.4 Comparison between nurses' demographic data and overall appraisal of their knowledge and attitudes toward pain management

Demographic data	Sub-groups	Knowledge and attitude levels			χ^2 P value
		Poor	Moderate	Good	
		n(%)	n(%)	n(%)	
Age / years	20 – 29	15 (11.1)	117 (86.7)	3 (2.2)	7.05 p:0.13
	30 – 39	4 (6.0)	57 (85.1)	6 (9.0)	
	40 – 49	2 (14.3)	12 (85.7)	0.0	
Gender	Male	6 (6.1)	90 (90.9)	3 (3.0)	3.58 p:0.16
	Female	12.8 (15)	82.1 (96)	5.1 (6)	
Academic achievement	Nursing Preparatory	3 (9.7)	28 (90.3)	0	7.43 p:0.28
	Diploma in nursing	4 (14.8)	21 (77.8)	2 (7.4)	
	B.Sc. in Nursing	8 (10.7)	63 (84.0)	4 (5.3)	
	M.Sc. in Nursing	9 (10.7)	74 (88.1)	1 (1.2)	
Years of Experience	1-10	18 (10.0)	156 (86.7)	6 (3.3)	85.52 p:0.000
	11-20	1 (4.0)	21 (84.0)	3 (12.0)	
	21-30	1(9.1)	1(9.1)	9 (81.8)	
Current Workplace	Emergency Room	9(9.9)	76(83.5)	6(6.6)	4.32 p:0.63
	ICU	3(6.3)	43(89.6)	2(4.2)	
	Medical Ward	4(10.5)	34(89.5)	0.0	
	Surgical Ward	5(12.8)	33(84.6)	1(2.6)	
Pain Management Training Course	No	14(12.1)	100(86.2)	2(1.7)	14.5 p:0.000
	Yes	6(6.0)	79(79.0)	15(15.0)	

HS: High Significant at P value (<0.01); **NS:** Non-significant at P value (>0.05)

The relationship between the overall assessment of nurses' knowledge and attitude toward pain treatment and their demographic data is presented in Table 4.4. It shows that there was no significant correlation ($P>0.05$) between nurses' overall knowledge and attitude toward pain management and their demographic data, with the exception of years of experience and participation in a pain management training course, where there was a highly significant difference ($P<0.01$) with nurses' knowledge and attitude toward pain management.

5. DISCUSSION

This chapter includes a discussion of the study findings with appropriate rationale and support by evidence from previous articles. The objective of the discussion is to describe and interpret the relevance of the results in light of what is already known about the research topic being investigated and to explain any new understanding that emerged as a result of the study. Untreated pain is a problem that impacts healthcare all around the world, causing problems and costs that can be avoided. Both health equity and medical care fairness require that all patients receive pain alleviation and other forms of comfort, and that they are not in any pain or suffering (Al-Sayaghi et al., 2022).

5.1 Discussion of Nurses' Socio-Demographic Data

Through the analysis of the data, the distribution of demographic variables shows that the age group of participants was younger than thirty years old. These results are similar to a study conducted at Imam Hussein Medical City that reported a high percentage of nurses were aged 20-29 years (Saied & Mansour, 2021), which is also consistent with a study carried out at Bindura Hospital (Manwere et al., 2015). From the researcher's point of view, the majority of nurses who are over forty years of age prefer to do administrative jobs related to nursing rather than clinical jobs. They also prefer to work in other health centers due to the lower number of patients compared to teaching hospitals. Concerning gender, the study results reveal that the highest percentage of the study sample were female. This result agrees with studies that were conducted by Shalabia et al., (2015) entitled "impact of applying brief

educational program on nurses' knowledge, attitude, and practices toward pain management" and Kiwanuka & Masaba, (2018) who studied "nurses' knowledge, attitude, and practices regarding pain assessment among patients with cancer at Uganda Cancer Institute." They found that the majority of the study sample were female (Kiwanuka & Masaba, 2018). The reason for the higher percentage of females compared to males is likely to be the low demand to study nursing among males as a result of popular and stereotyped ideas that nursing is a female profession, in addition to beliefs regarding job requirements being inappropriate for men. Concerning the level of education, the highest percentage of nurses had graduated with a bachelor's degree. This result is consistent with a study that was carried out in the United Arab Emirates which reported a high percentage (more than three quarters) of nurses who graduated with bachelor's degrees (Salim et al., 2020). Another study done in Palestine (Nimer & Ghrayeb, 2017) also reported the highest percentage of nurses (more than half) graduated with a bachelor's degree. Logical thinking leads a person to desire to develop themselves and change the course of their life for the better, which is the same reason that prompted nurses with a nursing diploma to continue their studies at the College of Nursing and obtain a bachelor's degree. Regarding years of experience, the present study shows that the majority of the study sample had between 1 to 10 years of experience. These results agree with another study done by Kiwanuka & Masaba (2018), who discovered in their study called "nurses' knowledge, attitude, and practices regarding pain assessment among patients with cancer at Uganda Cancer Institute" that the majority of the study sample had 1–10 years of experience (Kiwanuka & Masaba, 2018). The current study is also consistent with Salameh (2018) in his study "nurses' knowledge regarding pain management in high acuity care units: a case study of Palestine," who discovered that years of working experience were mostly from 0 to 10 years (0–5 years: 48.8%; 6–10 years: 28.5%) (Salameh, 2018). In relation to training sessions about pain management, the study showed that more than half of the participants had received no training. This result agrees with several studies showing the majority of the study samples had no training (Al Qadire & Al Khalaileh, 2014; Germossa et al., 2018). This may be because the training courses organized by health institutions are very concerned with critical care and rarely address pain management.

5.2 Discussion of Nurse's Knowledge and Attitudes Towards Pain Management

In general, the results of this study demonstrated that the surveyed nurses had fair knowledge and attitudes toward pain, which is an unacceptable level. The results of the current study agree with previous studies about pain management knowledge performed in other countries, such as Jordan, Spain, the United States, and Iceland (El-Aqoul et al., 2020; Zuazua-Rico et al., 2019; Mocerri & Drevdahl, 2014; Gretarsdottir et al., 2017), respectively. Furthermore, the overall results of the current study were higher compared to the results of other prior studies in Saudi Arabia (Samarkandi, 2018), Bahrain (Alkhatib et al., 2020), and Jordan (Yaqoob & Nasaif, 2015). The possible justification for this difference might be due to sample size, setting of the study, socioeconomic status, and the use of different data collection tools. The problem of pain under-assessment as well as under-treatment persists, and the patient suffer due to continued pain. Inadequate knowledge and negative attitudes towards the assessment and management of pain might be the result of a lack of attention given to pain-related topics and the lack of sufficient time devoted to this topic in nursing school curricula. This means that nurses don't learn enough about pain during their undergraduate education, and there aren't enough programs to teach nurses about pain while they're employed (Ortiz et al., 2015; Nguyen et al., 2021). The comparison of the responses to some items shows disagreement between the nurses' knowledge and beliefs and their pain assessment and management practices. Even though nearly two-thirds of the nurses agreed that pain is subjective and that a patient's self-report is the best way to figure out how bad pain is, nearly the same number agreed that placebo (which is an unethical practice) is a good way to figure out if there is real pain and if the patient is telling the truth, which is in line with prior literature (Admass et al., 2020; Al Qadire & Al Khalaileh, 2014). In the current study, more than half of the nurse participants correctly identified the patient as the most accurate judge of their pain. Nevertheless, when the nurses were asked to evaluate the amount of pain experienced by two patients (one of whom was smiling while the other was grimacing), both of whom evaluated their pain as an 8 out of 10, fewer than half of the nurses documented the pain as it was described by the patients. These findings are in line with evidence that nurses still do not take patients' verbal reports of pain into consideration, which

were advocated to be the most reliable source for pain assessment. When it comes to effectively managing pain, one of the most common and significant challenges is inaccurate pain assessment (Deldar et al., 2018; Khalil & Mashaqbeh, 2019). It is possible that the patient's health will suffer as a result of its various adverse effects. In the current study, the nurses achieved low scores for questions about pharmacology (such as the right dose, effect duration, and rotation between drugs), the preferred route of administration, and fear of addiction. Their lack of information appears to be due to erroneous assumptions. Their ignorance of analgesic pharmacology, particularly opioid pharmacology, is consistent with earlier research that recognized pharmacology-related issues as critical to pain treatment and was thus accorded significant weight in the KASRP survey result reporting (Bartoszczyk & Gilbertson-White, 2015; Samarkandi, 2018). As a result, this lack of understanding may create further hurdles to pain management, preventing patients from obtaining proper care. The largest knowledge and attitude gap among nurses concerned pharmacological pain treatment. The majority of nurses were unaware about the action and duration of morphine, as well as the function of acetaminophen and other nonsteroidal anti-inflammatory drugs (NSAIDs). A dearth of knowledge existed about the pharmacokinetics of analgesics. Effective pain treatment requires a solid understanding of fundamental pharmacology and the capacity of nurses to match their pharmacologic resources to the requirements of their patients. In the case studies, relatively few nurses acknowledged significant discomfort of patients or addressed their requirements for analgesics. In contrast, about 81.9% believed that after the initial dose of an opioid painkiller, later doses should be adjusted based on how each patient responds. This is consistent with the findings of prior studies (Eid et al., 2014). As reported by Samarkandi (2018) and Al-Sayaghi et al. (2022), this study revealed a lack of understanding regarding opioid usage as well as inappropriate approaches to dealing with addiction and respiratory depression as a result of opioid use. The research shed light on a number of common misunderstandings about the effects of opioid medications. More than three-quarters of the participants were able to correctly identify the concept of addiction; nevertheless, they were unable to differentiate between terminology such as physical dependency, tolerance, and addiction. Therefore, fewer than three-quarters of nurses correctly answered the question about physical dependence (Samarkandi, 2018; Al-Sayaghi

et al., 2022). The majority of nurse participants encouraged the patient to tolerate pain as much as possible before administering opioid analgesics, and nearly two-thirds of nurses left the patient suffering to find the source of the pain, agreeing with Samarkandi (2018), Nguyen et al. (2021), and Lui et al. (2008). A patient's suffering is morally unacceptable, and the nurses must know that there is no point in encouraging the patient to tolerate pain and no value in maintaining suffering while seeking the source of pain (Issa et al., 2017). Only 24% of the participants in this study correctly answered a question about the suggested opioid analgesia administration routes for persistent cancer-related pain, which is supported by the literature (Nguyen et al., 2021; Al-Sayaghi et al., 2022). According to Alkhatib et al. (2022) and Alqahtani & Jones (2015), the majority (69%) agreed that drug addicted patients should not be given opioid analgesia if they are in pain, which is morally and therapeutically unjust. Regardless of drug addiction background, the patient has the right to obtain the proper treatment to relieve their suffering. Poor awareness of pain pharmacological therapies may be a consequence of erroneous perceptions that pain medicine is a physician's responsibility and that nurses have no influence over the doctor's prescription (van Dijk et al., 2017). Opioid titration was also a problem in the current study; when nurse participants were asked to choose opioid dosages for two case scenarios of smiling and grimacing patients who both assessed their pain as 8 out of 10, only a third of the nurses accurately stated that they would provide the right quantity of morphine to both patients, respectively. These findings are in line with previous research that indicated nurses used improper analgesic doses to treat pain (Khalil & Mashaqbeh, 2019; Wang & Tsai, 2010). Inadequate nurse understanding of proper opioid titration is a serious problem in pain management, and it is linked to opioid undertreatment and overtreatment (Paschkis & Potter, 2015; Oliver et al., 2012). Concerning the association between the general assessment of nurses' knowledge and attitudes towards the management of pain and demographic data, such as age, gender, educational level, and workplace, there was an insignificant association between the general assessment of nurses' knowledge and attitudes about pain management and this demographic data. Regarding other demographic data such as years of experience and participating in a pain management training course, the analysis shows that there was a highly significant association with nurses' knowledge and attitudes towards pain management. This result agrees with Brant et al.

(2017), who indicated that there was an insignificant association between the overall assessment of nurses' knowledge and attitude about the management of pain and their demographic data, except for years of experience and participating in a pain management training course. There was a highly significant association with nurses' knowledge and attitude regarding pain management (Brant et al., 2017).

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The main purpose of this chapter is to define the answer to the main research question clearly, summarize the key findings, outcomes, or information in the study, make recommendations for future work about the topic and demonstrate new knowledge found in the study.

According to the present study finding, the following conclusions can be made:

- The majority of nurses had fair knowledge and attitudes toward pain management, which is an unacceptable level.
- Almost two-thirds of the nurses were in the young age group, with one to ten years of experience in nursing.
- More than half of the nurses in the study sample had received no previous training course about pain management.
- There was an insignificant association between the overall assessment of nurses' knowledge and attitudes towards pain management and their demographic data, except for years of experience and participating in a pain management training course. There was a highly significant association between these two factors with nurses' knowledge and attitudes towards pain management.

- Nurses need to be more knowledgeable and have a more positive attitude toward pain assessment and management.
- In hospitals, serious interventions are needed, and nurses should have sufficient, up-to-date, and accurate knowledge about how to assess and treat pain.

6.2 Recommendations

Based on the results, discussion and conclusions in the study, the following recommendations are made:

- It is imperative that hospitals provide ongoing educational and evaluation programs for nurses about pain assessment and management.
- In order to alleviate patient suffering in hospitals, permanent periodical in-service teaching and evaluation programs about pain assessment and management are required.
- Ministries of health should encourage methods to involve nurses in seminars and symposia to improve their knowledge and attitudes and keep them up to date about pain management.
- In order to provide patients with healthcare that is both safe and ethical, nurses need to acknowledge the gaps in their knowledge and actively work to fill these gaps in order to meet the needs of the patients they care for.
- Changing wrong beliefs and outdated information of nurses that have been proven wrong is required, while updating their pain management knowledge.
- Further study with a larger sample including other Iraqi regions is necessary about nurses' knowledge and attitudes about pain management.

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APPENDICES

Appendix 1. Questionnaire

Appendix 2. Ethical approval from Cankiri Karatekin University

Appendix 3. Ethical approval from Iraq

Appendix 4. Originality Report



Appendix 1. Questionnaire



Part I: Socio-demographic data













Appendix 2. Ethical approval from Cankiri Karatekin University



Appendix 3. Ethical approval from Iraq





Appendix 4. Originality Report



CURRICULUM VITAE

Personal Information

Name and Surname : Amjed Sabah Hasan KHAZAAL

