SHORT-TERM EFFECT OF WAITING TIME ON CLINICAL OUTCOMES IN PATIENTS WITH NON-SPECIFIC CHRONIC LOW BACK PAIN

BY

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CERTIFICATION

This dissertation by Igbobie Okwuchukwu Emmanuel is accepted in its present form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

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DEDICATION

This dissertation is dedicated to God Almighty who made this project possible. Also, to my parents Mr. and Mrs. Igbobie for their spiritual and moral support during the operation of this research work.

ABSTRACT

Background / Purpose of the Study:
Non-specific chronic low back pain (NSCLBP) is a leading cause of disability worldwide. Prolonged waiting in physiotherapy clinics may aggravate pain and influence treatment outcomes. This study examined the effect of waiting time on clinical outcomes of pain intensity and coping strategies (catastrophising, diverting attention, reinterpretation of pain, cognitive coping) in patients with NSCLBP attending physiotherapy sessions at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria.

Methods / Procedures:
Sixty patients diagnosed with NSCLBP participated in this prospective study. Standardized instruments were used, including the Visual Analogue Scale (VAS) for pain intensity, the Coping Strategies Questionnaire (CSQ-24), and a 0–100 satisfaction score. Waiting time was measured as the interval between patient arrival and treatment start, using a Digital stopwatch. Descriptive statistics of mean and standard deviation were used to summarize participants' characteristics, while inferential statistics of paired t-tests, MANOVA, Pearson's correlation, and chi-square tests were used to analyse data at $p < 0.05$.

Results:
Most participants (73.3%) waited less than 30 minutes. Pain intensity slightly increased during waiting ($p < 0.001$) but significantly decreased post-treatment ($p < 0.001$). Waiting time had no significant effect on pain, catastrophizing, or cognitive coping but influenced reinterpretation of pain ($p = 0.006$). A strong association was found between shorter waiting periods and higher satisfaction levels ($\chi^2 = 51.74$, $p < 0.001$). Longer waits showed weak but positive correlations with post-treatment cognitive coping ($r = 0.285$, $p = 0.027$).

Conclusion:
Brief waiting times increased pre-treatment pain slightly but did not adversely affect overall outcomes. Physiotherapy effectively reduced pain and improved adaptive coping. Efficient scheduling, patient education, and supportive communication during waiting are recommended to enhance satisfaction and treatment success.

Keywords: Non-specific chronic low back pain, waiting time, physiotherapy, coping strategies, satisfaction

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Non-specific chronic low back pain (NSCLBP) patients attending physiotherapy sessions often endure prolonged waiting times, typically 30 minutes to over an hour due to operational inefficiencies like staff shortages and overbooking (Valenzuela-Moss *et al*., 2023; Murtagh *et al*., 2024). Emerging evidence suggests these delays may worsen pain and stiffness before treatment begins, counteracting therapeutic benefits (Grewwal *et al*., 2024; McDevitt *et al*., 2023). Also, prolonged static postures during waiting periods can increase spinal stress, while psychological factors like frustration and anxiety may further diminish treatment effectiveness (Petrelis *et al*., 2025). Despite these concerns, the direct impact of waiting times on clinical outcomes remains understudied (Cattrysse *et al*., 2024).

Non-specific chronic low back pain (NSCLBP) patients attending outpatient physiotherapy sessions often face significant waiting periods before receiving treatment, a factor that may critically influence their clinical outcomes (Murtagh *et al*., 2024). These waiting times occur due to various operational challenges including staff shortages, appointment overbooking, and inefficient patient flow management (Valenzuela-Moss *et al*., 2023). For NSCLBP patients, who often experience morning stiffness and heightened pain sensitivity upon waking, these prolonged waiting periods may exacerbate symptoms before treatment even begins, potentially undermining the effectiveness of subsequent therapeutic interventions (Grewwal *et al*., 2024; Marrache *et al*., 2022).

The physiological impact of waiting periods on NSCLBP patients warrants particular attention. Research indicates that prolonged static postures during waiting times whether sitting in clinic chairs or standing in queues—can increase intradiscal pressure and paraspinal muscle tension, potentially aggravating existing pain conditions (Valenzuela-Moss *et al*., 2023). A recent observational study found that a large proportion of NSCLBP patients reported increased pain intensity after 30 minutes of waiting, with measurable decreases in lumbar range of motion before their scheduled treatment time (Murtagh *et al*., 2024). These findings suggest that morning waiting periods may inadvertently create a therapeutic paradox where patients arrive for pain relief but experience symptom exacerbation before treatment commences (Grewwal *et al*., 2024; McDevitt *et al*., 2023).

Psychological factors compound these physiological effects. Morning appointments are often preferred by NSCLBP patients due to perceived higher energy levels and motivation earlier in the day. However, prolonged waiting can lead to frustration, anxiety, and decreased treatment expectation factors known to negatively influence pain perception and treatment outcomes (Petrelis *et al*., 2025). The stress response triggered by unexpected delays may elevate cortisol levels and muscle tension, potentially counteracting the relaxation and pain modulation goals of physiotherapy (Murtagh *et al*., 2024). This is particularly concerning given the established link between psychological state and chronic pain perception in NSCLBP populations (McDevitt *et al*., 2023).

Clinic operational factors significantly contribute to waiting times. Peak appointment scheduling in early hours, combined with staff preparation routines and emergency walk-in cases, frequently creates bottlenecks in patient flow (Valenzuela-Moss *et al*., 2023). A recent audit of outpatient physiotherapy departments revealed that morning sessions had substantially longer average waiting times compared to afternoon slots, with the first appointments of the day being most susceptible to delays due to preparatory activities (Cattrysse *et al*., 2024). These operational realities highlight a systemic challenge in balancing clinic efficiency with optimal patient care delivery.

The socioeconomic dimensions of waiting times present additional concerns. Working patients who schedule early appointments to minimize work disruption often face particular stress when delays occur, potentially leading to premature departure or reduced engagement with treatment. Elderly patients or those with comorbidities may find prolonged morning waiting physically taxing, while parents balancing childcare responsibilities experience unique stressors (Marrache *et al.*, 2022). These demographic-specific challenges underscore the need for tailored approaches to managing waiting periods in outpatient physiotherapy settings.

Current strategies to mitigate waiting times show varying effectiveness. Some clinics have implemented staggered scheduling, dedicated treatment spaces for NSCLBP patients, or pre-appointment telehealth check-ins to optimize flow (Valenzuela-Moss *et al.*, 2023; Cattrysse *et al.*, 2024). However, evidence regarding the impact of these interventions on clinical outcomes remains limited (Grewwal *et al.*, 2024). A pilot study introducing "quick assessment" stations for NSCLBP patients demonstrated substantial reductions in waiting times and improved patient satisfaction, though long-term effects on pain and function were not assessed (Murtagh *et al.*, 2024; McDevitt *et al.*, 2023). This gap in outcome-focused research highlights the need for rigorous evaluation of waiting time reduction strategies.

Understanding the relationship between morning waiting periods and clinical outcomes in NSCLBP patients is crucial for optimizing outpatient physiotherapy services. As healthcare systems increasingly emphasize patient-centered care and value-based outcomes, addressing the often-overlooked factor of intraday waiting times may represent an important opportunity to enhance treatment efficacy (Marrache *et al.*, 2022; Valenzuela-Moss *et al.*, 2023). Research that quantifies the threshold at which waiting times negatively impact outcomes and evaluates targeted interventions to minimize these effects will ultimately improve the quality of care for NSCLBP patients (Grewwal *et al.*, 2024; Murtagh *et al.*, 2024). This study seeks to bridge that gap, offering insights to optimize patient care and clinic operations for better pain management outcomes.

1.2 Statement of the Problem

Non-specific chronic low back pain (NSCLBP) is a leading cause of disability globally, with substantial implications for patients' functional capacity and quality of life. At the University of Benin Teaching Hospital (UBTH), outpatient physiotherapy is a critical component of management for individuals suffering from NSCLBP. However, prolonged waiting times before patients can access physiotherapy services have become increasingly common, largely due to resource constraints and increasing patient loads in developed countries, more so in low and middle-income countries like Nigeria. These delays may exacerbate symptoms, reduce patient motivation, and diminish the potential effectiveness of therapeutic interventions. Despite the high prevalence of NSCLBP and the recognized importance of early intervention, there is a lack of local data evaluating how waiting time before the commencement of physiotherapy affects clinical outcomes in this population.

Existing literature suggests that timely access to physiotherapy is crucial for improving pain relief, functional recovery, and overall quality of life in patients with musculoskeletal disorders. However, at UBTH, the impact of waiting times on treatment outcomes among NSCLBP patients remains poorly understood. Without empirical evidence, it is difficult for hospital administrators and policymakers to make informed decisions about resource allocation, scheduling, and service delivery improvements. This gap highlights the urgent need to investigate the effect of waiting time on clinical outcomes in patients with NSCLBP attending outpatient physiotherapy at UBTH.

1.3 Research Questions

The study was designed to answer the following research questions:

i. What would be the average waiting time experienced by patients with NSCLBP before receiving treatment at the outpatient physiotherapy department of the UBTH?

ii. What would be the effect of waiting time on pain intensity in patients with NSCLBP before and after receiving treatment at the outpatient physiotherapy department of the UBTH?

iii. What would be the association between waiting time and patients' satisfaction in patients with NSCLBP before and after receiving treatment at the outpatient physiotherapy department of the UBTH?

iv. What would be the effect of waiting time on coping strategy (catastrophising, diverting attention, cognitive coping and pain reinterpretation) in patients with NSCLBP before and after receiving treatment at the outpatient physiotherapy department of the UBTH?

v. What would be the relationship between actual waiting time and clinical outcomes (pain intensity, catastrophising, reinterpretation, diverting attention and cognitive coping.e.t.c)

1.4 Aims of the Study

The overall aim of this study was to investigate the effect of waiting time on clinical outcomes (pain intensity, patients' satisfaction, catastrophising, diverting attention, cognitive coping and pain reinterpretation) in patients with NSCLBP attending outpatient physiotherapy at the UBTH.

1.4.1 Specific Objectives

The objectives of this study were:

i. To determine the average waiting time in patients with NSCLBP before receiving physiotherapy intervention

ii. To determine the effect of waiting time on pain intensity in patients with NSCLBP before and after receiving physiotherapy intervention.

iii. To determine the association between waiting time and patient satisfaction experienced by patients with NSCLBP before and after receiving physiotherapy intervention.

iv. To determine the effect of waiting time on coping strategy (catastrophising, diverting attention, cognitive coping and pain reinterpretation) experienced by patients with NSCLBP before and after receiving physiotherapy intervention.

1.5 Hypothesis

1.5.1 Main Hypothesis

There would be no significant difference in clinical outcomes (pain intensity, patient satisfaction, catastrophising, diverting attention, cognitive coping and pain reinterpretation) in patient with NSCLBP before and after waiting for treatment.

1.5.2 Sub Hypothesis

i. There would be no significant difference in pain intensity in patients with NSCLBP before and after waiting for treatment.

ii. There would be no significant association between patient waiting time for physiotherapy treatment and patient satisfaction after receiving treatment

iii. There would be no significant difference on pain catastrophising in patients with NSCLBP before and after waiting for treatment.

iv. There would be no significant difference on diverting attention as a coping strategy in patients with NSCLBP before and after waiting for treatment.

v. There would be no significant difference on cognitive coping mechanisms in patients with NSCLBP before and after waiting for treatment.

vi. There would be no significant difference on pain reinterpretation strategies in patients with NSCLBP before and after waiting for treatment.

1.6 Scope of the Study

This study was focused on adult patients with NSCLBP aged 18 years and above who attended the orthopedic outpatient physiotherapy clinic at the UBTH. The study was delimited to waiting time before treatment intervention measured with a digital stop watch and clinical outcomes of pain intensity measured with the Visual Analogue Scale (VAS), coping strategies (catastrophising, diverting attention, cognitive coping, and pain reinterpretation) measured using the Coping Strategies Questionnaire (CSQ), and patient satisfaction level measured on a 0–100 scale.

1.7 Limitations of the Study

i. The study was limited to a single tertiary hospital (UBTH), which may restrict the generalization of findings to other healthcare settings.

ii. The sample size of participants may not adequately represent the broader population of NSCLBP patients.

iii. The study relied on self-reported measures such as pain intensity and coping strategies, which may be influenced by subjective bias and individual perception.

iv. The study did not assess long-term outcomes; therefore, the lasting effect of waiting time on pain, satisfaction, and coping strategies could not be determined.

1.8 Significance of the Study

It is hoped that this study would be significant in providing evidence-based insights into how waiting time before physiotherapy affects clinical outcomes in patients with NSCLBP at the UBTH. The hospital administrators and health policymakers would benefit from the results by using the data to optimize resource allocation, staffing, and scheduling systems to reduce delays and improve service delivery. Physiotherapists and clinical practitioners would be better informed about the consequences of delayed treatment, enabling them to advocate for earlier interventions to improve patient outcomes. Patients themselves would ultimately benefit from improved access to timely physiotherapy care, which may lead to faster recovery, reduced pain, and enhanced quality of life. Also, the study would contribute to the existing body of academic and clinical literature, serving as a foundation for future research on healthcare system efficiency and musculoskeletal care in similar low-resource settings.

1.9 Definition of Terms

Waiting Time: it refers to the duration a patient spends waiting to receive assessment, treatment, or consultation after arriving for their scheduled appointment (World Health Organization, 2023; Oche and Adamu, 2013).

Clinical Outcomes: Measurable changes in health status resulting from healthcare interventions, including pain relief, functional improvement, mobility, and patient satisfaction (Chartered Society of Physiotherapy, 2025).

Non-specific Chronic Low Back Pain (NSCLBP): Persistent or recurrent pain in the lower back region lasting more than 12 weeks, without a clearly identifiable underlying pathology such as infection, malignancy, or fracture (World Health Organization, 2023).

Outpatient Physiotherapy:

A form of rehabilitative care provided to patients who visit the hospital for scheduled physiotherapy sessions without being admitted to the hospital (Physiopedia, 2025).

1.10 List of Abbreviations / Acronyms

Abbreviation	Meaning
ADLs	Activities of Daily Living
BMI	Body Mass Index
CLBP	Chronic Low Back Pain
CNS	Central Nervous System
CSQ	Coping Strategies Questionnaire
CSQ-24	Coping Strategies Questionnaire (24-item version)
DRG	Dorsal Root Ganglion
L1–S5	Lumbar 1 to Sacral 5 Spinal Nerves
LBP	Low Back Pain
MANOVA	Multivariate Analysis of Variance
MD	Mean Difference
N	Sample Size
NICE	National Institute for Health and Care Excellence
NRS	Numeric Rating Scale
NSCLBP	Non-Specific Chronic Low Back Pain
ODI	Oswestry Disability Index
P	Probability Value (Significance Level)
RMDQ	Roland–Morris Disability Questionnaire
RVM	Rostroventral Medulla
SD	Standard Deviation

SPSS	Statistical Package for the Social Sciences
UBTH	University of Benin Teaching Hospital
VAS	Visual Analogue Scale
WHO	World Health Organization
YLDs	Years Lived with Disability

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review of the Lumbar Spine (Lower Back)

The lumbar spine, consisting of five vertebrae labeled L1 through L5, forms the lower portion of the vertebral column and plays a pivotal role in supporting upper body weight and enabling flexibility in the trunk. Structurally, the lumbar vertebrae are the largest and strongest in the spinal column, adapted to withstand compressive and shear forces resulting from both static posture and dynamic activities like lifting or twisting (figure 1) (Moore *et al*.,2018). Each vertebra features a broad vertebral body for load-bearing, a vertebral arch that protects the spinal cord, and several processes that serve as attachment sites for muscles and ligaments. The alignment and articulation of the vertebrae form the lumbar lordosis, a natural inward curvature essential for shock absorption and biomechanical efficiency during movement (Marras et., al 2017). Disruption in the curvature or degeneration of any lumbar vertebral component may contribute to conditions like NSCLBP, particularly in individuals with sedentary lifestyles or poor ergonomics (Ferreira & de Luca, 2017).

The stability of the lumbar spine is achieved through a combination of passive, active, and neural subsystems. The passive subsystem comprises bony structures and intervertebral discs, which provide foundational support, while the active system involves muscles and tendons that generate forces necessary for motion and stability (Moore *et al*.,2018). The lumbar vertebrae are connected by intervertebral discs and facet joints that together allow for flexion, extension, lateral bending, and limited rotation.

These movement capabilities make the lumbar spine highly functional yet vulnerable to injury, especially under repetitive stress or improper mechanical loading. Aging and degenerative changes may also lead to reduced disc height and vertebral misalignment, commonly observed in patients with chronic low back pain (Ferreira & de Luca, 2017).

Biomechanically, the lumbar spine must balance mobility and stability while transmitting forces between the thoracic spine above and the sacrum below. Any compromise in its anatomical or functional integrity such as vertebral fractures, spondylolisthesis, or disc prolapse can lead to significant pain and functional limitation (Ghoshal & McCarthy, 2023). In clinical settings, imaging modalities like MRI and CT are employed to evaluate vertebral alignment, disc integrity, and joint involvement, aiding in the diagnosis and management of lumbar pathologies. Understanding the anatomy of the lumbar spine is therefore essential for developing effective physiotherapeutic interventions for low back disorders, particularly those seen in outpatient populations such as those at the University of Benin Teaching Hospital.

2.1.1 Muscles Involved in Lumbar Stability and Movement

Muscular support of the lumbar region is fundamental to spinal stability and dynamic control. The deep stabilizing muscles, including the transversus abdominis, multifidus, diaphragm, and pelvic floor muscles, form the "core" and act synergistically to provide segmental stability during movement and load transfer (Vasavada *et al*., 2017). The transversus abdominis, in particular, is activated prior to limb movement and increases intra-abdominal pressure, creating a stiffened cylinder that stabilizes the spine. The multifidus muscles, located deep and adjacent to the vertebrae, contribute significantly to postural control and are often found to be atrophied or dysfunctional in patients with chronic low back pain (Moore *et al*., 2018).

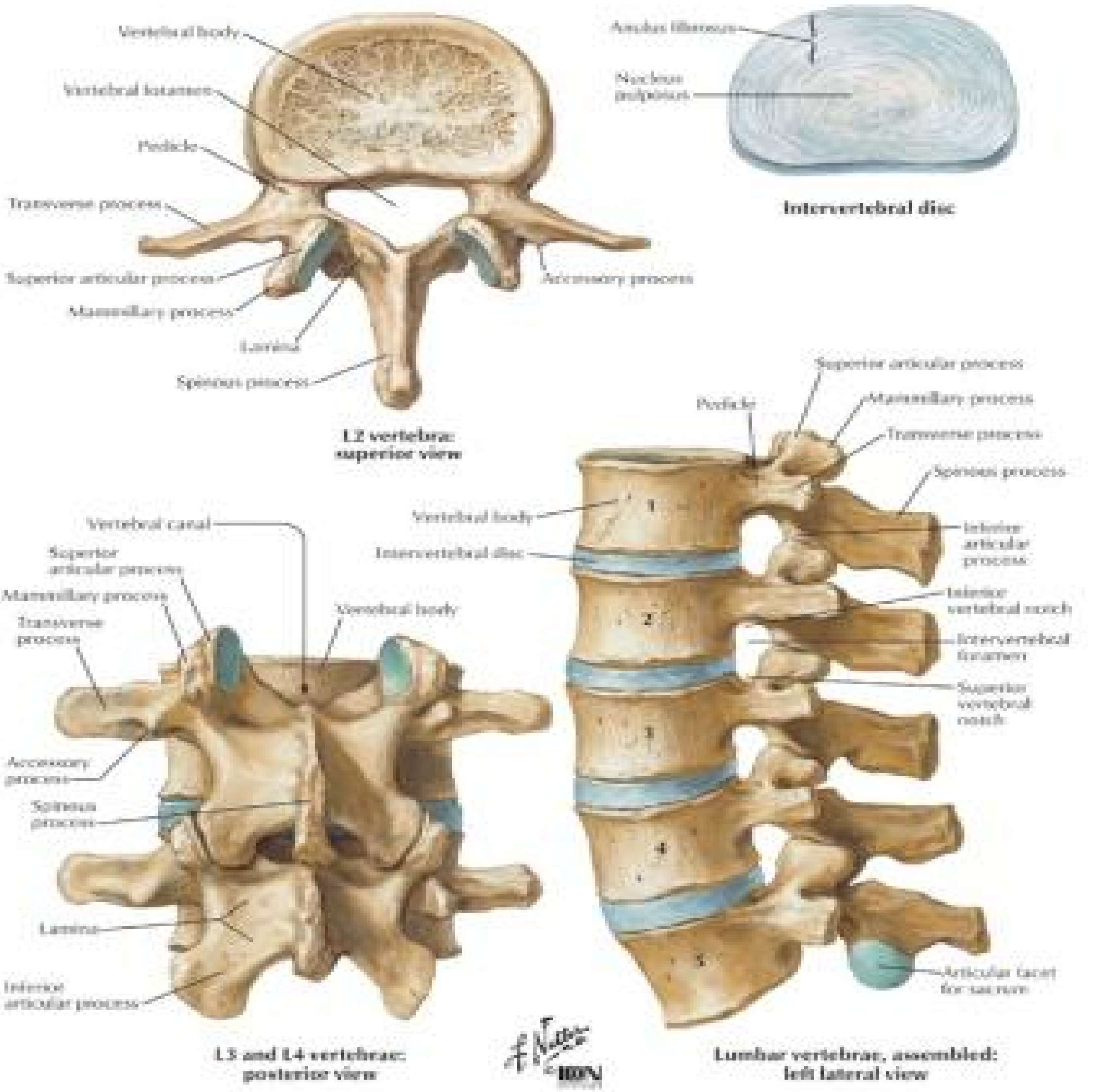

Figure 1: Lumber spine anatomy

(**Source**: Physiopedia)

Superficial muscles, such as the erector spinae, latissimus dorsi, and rectus abdominis, contribute to gross trunk movements including extension, rotation, and lateral bending (Figure 2). Although not primary stabilizers, they support spinal posture and facilitate forceful trunk movements (Vasavada *et al*., 2017). Dysfunction or fatigue in these muscles can alter movement patterns and increase reliance on passive spinal structures, potentially exacerbating pain and contributing to lumbar instability. Therapeutic exercise programs for individuals with low back pain often focus on reactivation and strengthening of these muscle groups to restore balanced load distribution across the lumbar spine (Ganesh *et al*., 2023).

The coordination of these muscles is regulated by the central nervous system, which modulates motor control based on proprioceptive feedback and anticipated load demands. In individuals with chronic low back pain, there is often a delay or alteration in deep muscle activation, suggesting a disruption in neuromuscular control mechanisms (van Dieën *et al*., 2019). Such dysfunctions may persist even after pain resolution, underscoring the importance of motor control retraining in physiotherapy. Addressing muscle imbalances and optimizing coordination through targeted interventions remains a cornerstone in the management of lumbar spine dysfunction.

2.1.2 Intervertebral Discs and Facet Joints

Intervertebral discs are fibro-cartilaginous structures situated between adjacent vertebral bodies, playing critical roles in load transmission and flexibility of the lumbar spine.

Each disc comprises a central gelatinous nucleus pulposus, which absorbs compressive forces, and a surrounding annulus fibrosus made of concentric collagen layers that resist torsional and shear stresses (Deneuville *et al*., 2025). With age or repetitive mechanical loading, the disc undergoes degenerative changes including dehydration, loss of disc height, annular fissures, and reduction in proteoglycan content. These changes diminish the disc's shock-absorbing capacity and compromise its mechanical integrity, contributing to discogenic pain, reduced spinal mobility, and possible nerve root impingement due to reduced foraminal space (Mohd Isa *et al*., 2023). Lumbar disc herniation, a condition in which the nucleus protrudes through the annulus, is a common cause of radicular symptoms and is frequently seen in patients with NSCLBP. Facet joints, also known as zygapophysial joints, are synovial articulations located between the posterior elements of adjacent vertebrae. They guide and restrict spinal movements, particularly rotation and extension, and bear a significant portion of axial load during certain activities (Kapetanakis & Gkantsinikoudis, 2021).

Diagnosing facet-mediated pain often involves diagnostic nerve blocks, and treatment may include manual therapy, radiofrequency ablation, or targeted exercise.

The interplay between discs and facet joints is crucial for maintaining spinal stability (Figure 4). As disc height reduces due to degeneration, facet joints may experience increased loading and become hypertrophic, a compensatory response that can further narrow the spinal canal or foramina (Deneuville *et al*., 2025). This cascade of biomechanical changes is a hallmark of degenerative disc disease and lumbar spinal stenosis. Therefore, understanding the anatomical and functional characteristics of intervertebral discs and facet joints is essential for accurately identifying pain sources and tailoring effective rehabilitation strategies. Clinicians must consider the multifactorial nature of low back pain, as both disc and facet joint pathologies often coexist and interact. Emerging research highlights the role of biomarkers, such as inflammatory cytokines in disc degeneration, and the potential for regenerative therapies, such as stem cell injections, to restore disc health (Du *et al*., 2023).

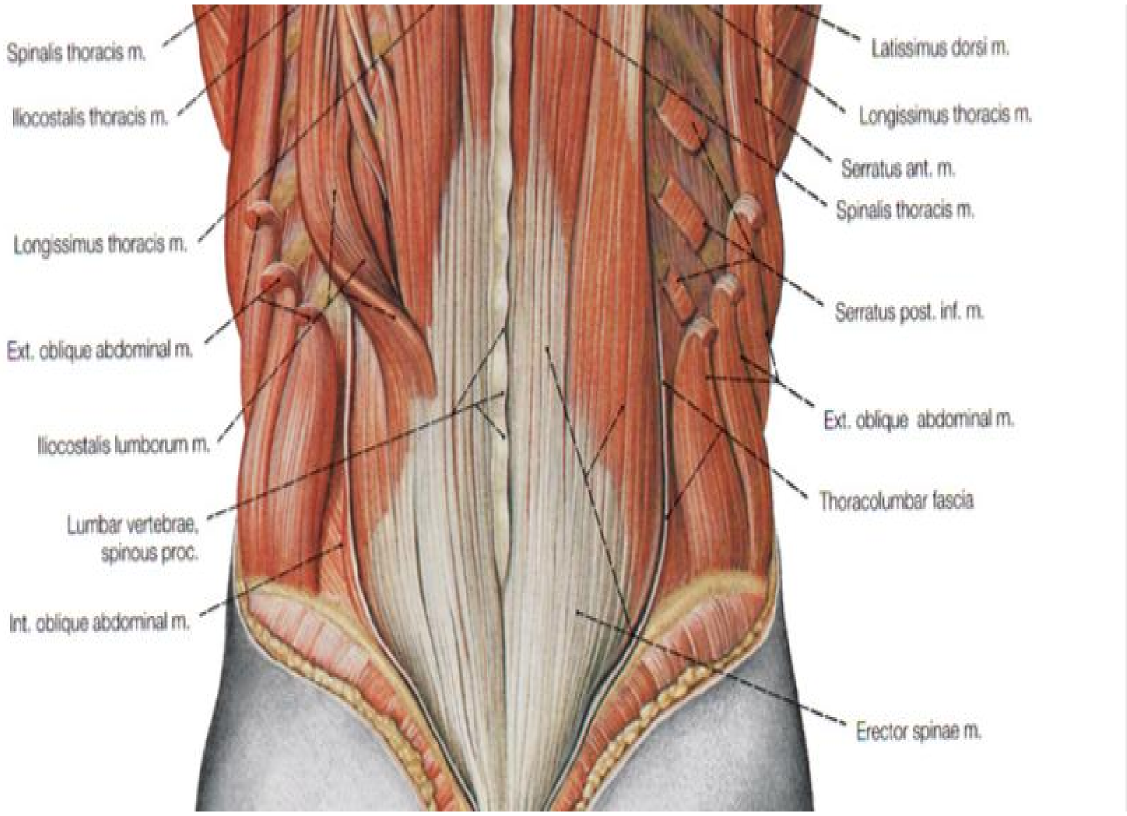

Figure 2: Muscles of lower back movement

(Source: Somerset, D. **(2015)**

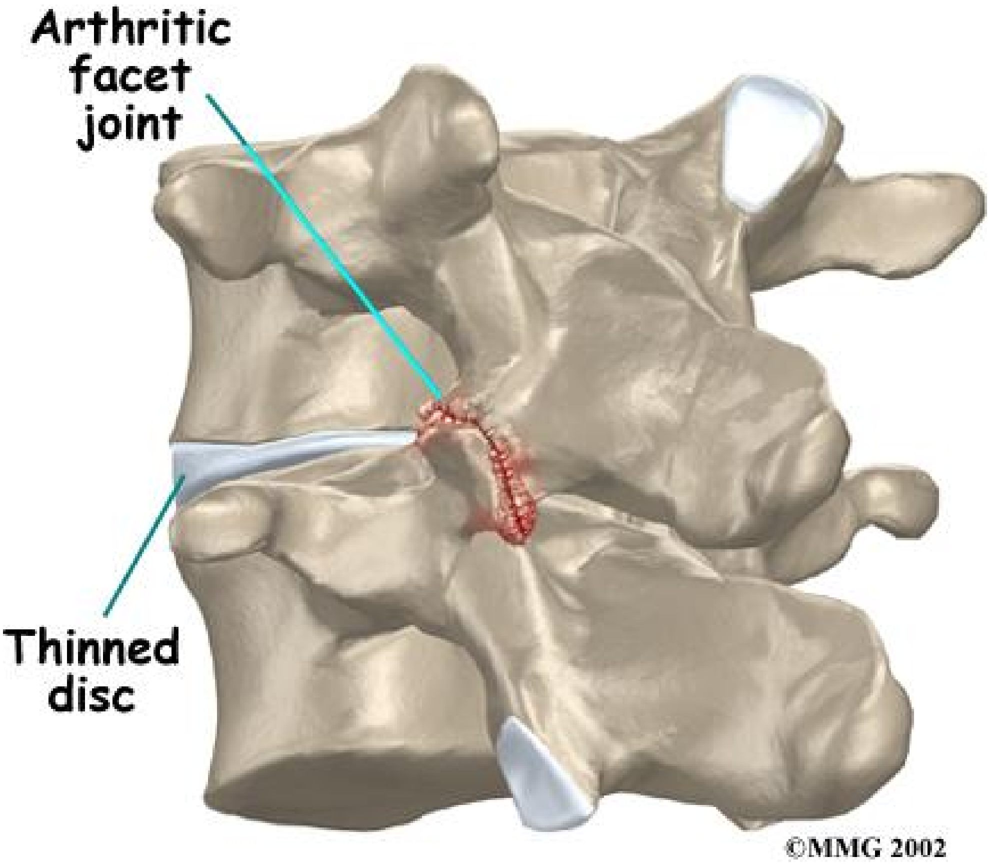

Figure 3: Spinal segment highlighting an Arthritic discs and facet joints (Source: MMG. (2000).

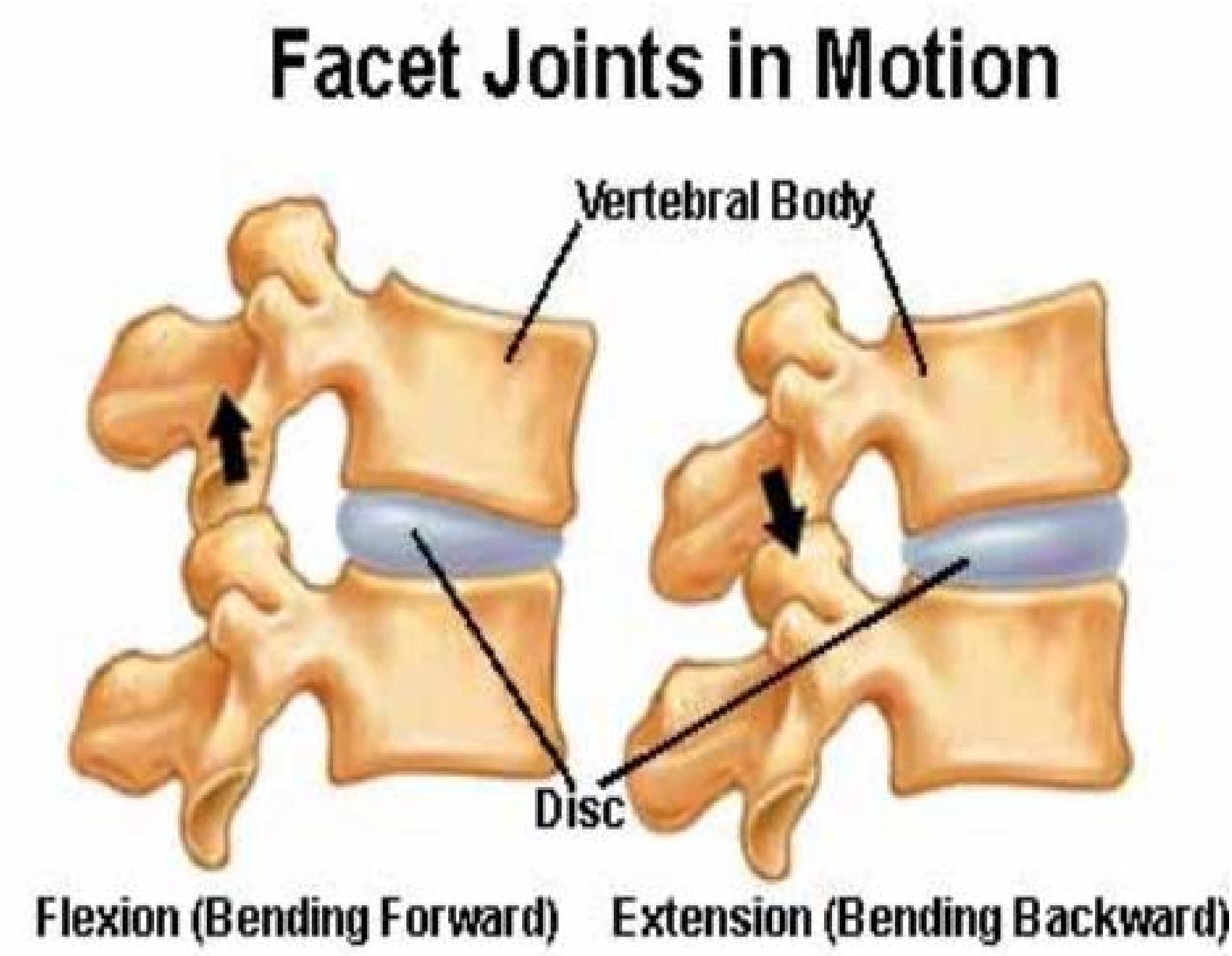

Figure 4: Intervertebral Discs and Facet Joints

(**Source**: © 2004-2025 Colorado Comprehensive Spine Institute)

2.1.3 Neural Structures and Pain Pathways

The lumbar spine encloses and protects several vital neural structures essential for motor control and sensory perception in the lower body. Chief among these are the cauda equina, spinal nerve roots, and dorsal root ganglia (DRG). The cauda equina is a bundle of spinal nerves and nerve roots that descends from the conus medullaris, typically beginning around the L1–L2 vertebral level, and extends through the lumbar spinal canal. These nerves are responsible for innervating the lower limbs, bladder, bowel, and sexual organs (Leng *et al*. (2018)

Each spinal nerve root arises from the spinal cord via two components: the dorsal (sensory) and ventral (motor) roots. These roots merge at the intervertebral foramen to form a mixed spinal nerve that branches out to supply muscles and skin. The dorsal root ganglion, located just before the nerve root exits the spinal column, contains the cell bodies of sensory neurons that relay nociceptive (pain), thermal, and proprioceptive information from the periphery to the central nervous system (Moore *et al*., 2018).

The intervertebral foramina, narrow bony canals between adjacent vertebrae, serve as exit pathways for these nerves. However, due to their confined anatomical space, these foramina are prone to encroachment from pathological changes such as intervertebral disc herniation, facet joint arthropathy, osteophyte formation, or ligamentum flavum hypertrophy. These changes may lead to mechanical compression or chemical irritation of the nerve roots, causing inflammation and radiculopathy. A common manifestation is sciatica, where compression of the L4–S1 nerve roots produces sharp, radiating pain, numbness, or weakness along the posterior aspect of the leg (Jensen *et al*., 2019).

Pain signals originating in the periphery travel through primary afferent neurons to the dorsal horn of the spinal cord. Within the dorsal horn, particularly in the substantia gelatinosa (lamina II), synaptic transmission occurs between primary afferents and second-order neurons. This region serves as a critical modulatory hub, influenced by descending inhibitory or facilitatory inputs from higher centers such as the periaqueductal gray (PAG), rostroventral medulla (RVM), and cerebral cortex (Peng *et al*., 2023).

From the dorsal horn, second-order neurons decussate (cross over) and ascend via the spinothalamic tract to the thalamus, which acts as a relay station to distribute signals to the somatosensory cortex, anterior cingulate cortex, and insula (Figure 5). These regions are responsible for processing the sensory-discriminative, affective, and cognitive dimensions of pain (Moore *et al*., 2018).

Prolonged activation of these pathways, as seen in non-specific chronic low back pain (NSCLBP), can lead to central sensitization—a state where the nervous system becomes hyper-responsive to both painful and non-painful stimuli. This maladaptive neuroplasticity can perpetuate pain even after the initial injury has resolved, contributing to chronic disability if not appropriately managed (Woolf, 2011).

The pathophysiology of chronic low back pain (CLBP) is multifactorial, involving a dynamic interplay between peripheral and central sensitization mechanisms. Peripheral sensitization arises from tissue injury or inflammation that lowers the activation threshold of nociceptors sensory neurons that detect painful stimuli, making them hyper-responsive. Inflammatory mediators such as prostaglandins, bradykinin, and cytokines released at the site of injury can sensitize these nociceptors, resulting in pain amplification and a lowered threshold for activation. This mechanism explains why areas surrounding an injury often become tender or hypersensitive (Li *et al*., 2021; Xu *et al*., 2020).

As acute pain persists, central sensitization may develop. This refers to a state of hyperexcitability within the central nervous system (CNS), particularly in the dorsal horn of the spinal cord and in various brain regions involved in pain perception and modulation. In this state, second-order neurons become more responsive to incoming signals, even when the original noxious stimulus is no longer present. This leads to phenomena such as allodynia (pain from non-painful stimuli) and hyperalgesia (increased sensitivity to painful stimuli). The process is mediated by a variety of changes, including enhanced synaptic transmission, disinhibition of inhibitory interneurons, and glial cell activation, all of which contribute to a self-perpetuating pain state (Rivera-Arconada *et al*., 2025).

Clinically, differentiating nociceptive from neuropathic pain is crucial for choosing appropriate treatment modalities, such as pharmacologic agents (e.g., gabapentinoids) or nerve mobilization techniques. Therefore, a thorough understanding of lumbar neural anatomy and its role in pain pathways enhances clinical assessment and informs evidence-based physiotherapeutic management strategies.

A dermatomal map illustrates the areas of skin supplied by specific spinal nerves, which can help understand lower back pain (LBP) when nerve irritation or compression is involved (Figure 6). LBP often relates to spinal nerve pathways, particularly those exiting the lumbar and sacral spine (L1–S5) (Healthline, 2025). Additionally, the lumbar sympathetic chain and autonomic nervous system may contribute to the maintenance of pain via vasomotor and trophic changes in affected tissues. In certain cases, nerve root inflammation or sensitization can lead to neuropathic pain, a type of pain characterized by burning, shooting sensations, and heightened sensitivity to touch or temperature (Xu *et al*., 2024).

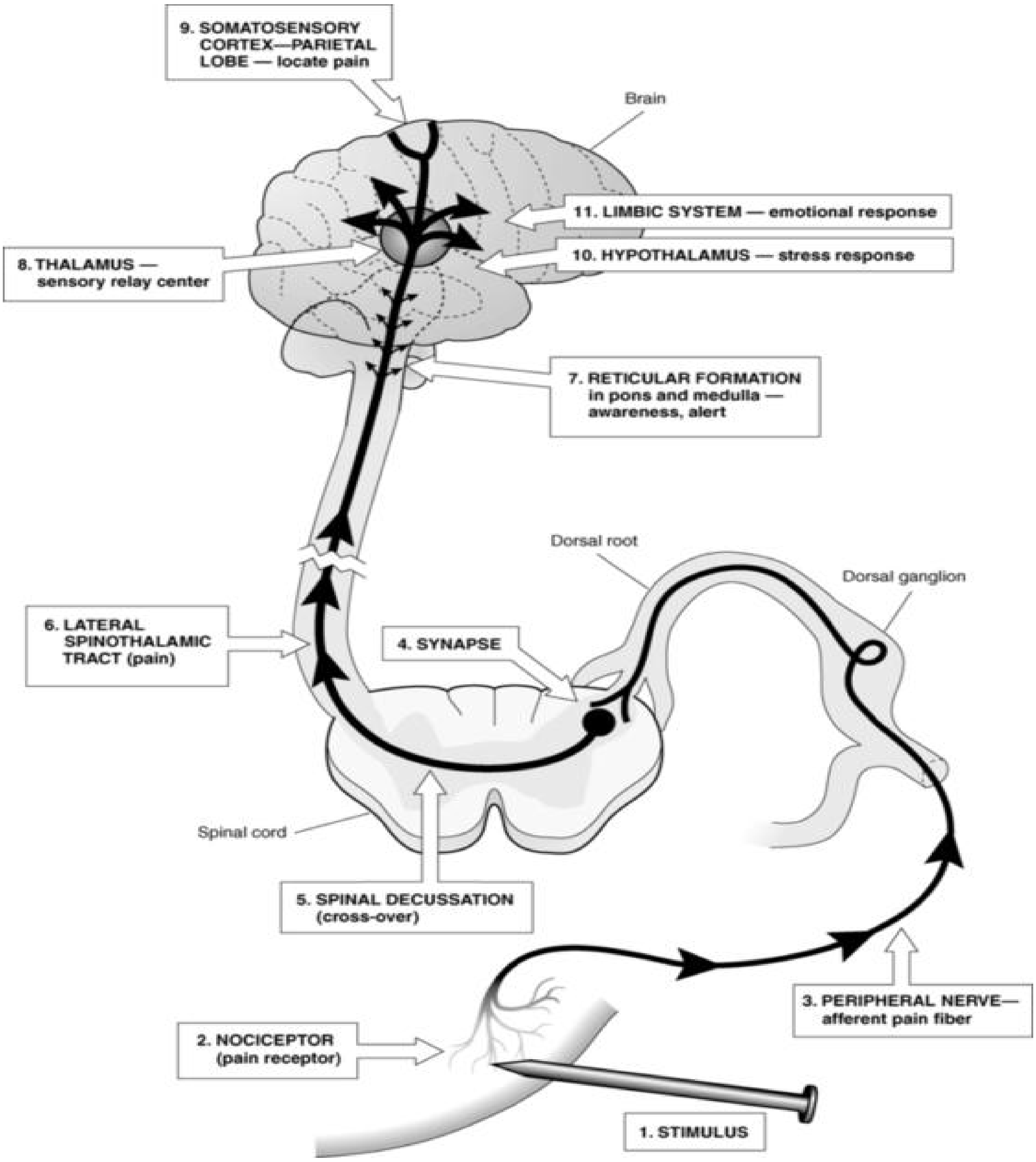

Figure 5: Pain pathways

(From Gould BE: *Pathophysiology for the health professions,* ed 2, Philadelphia, 2002, WB Saunders.)

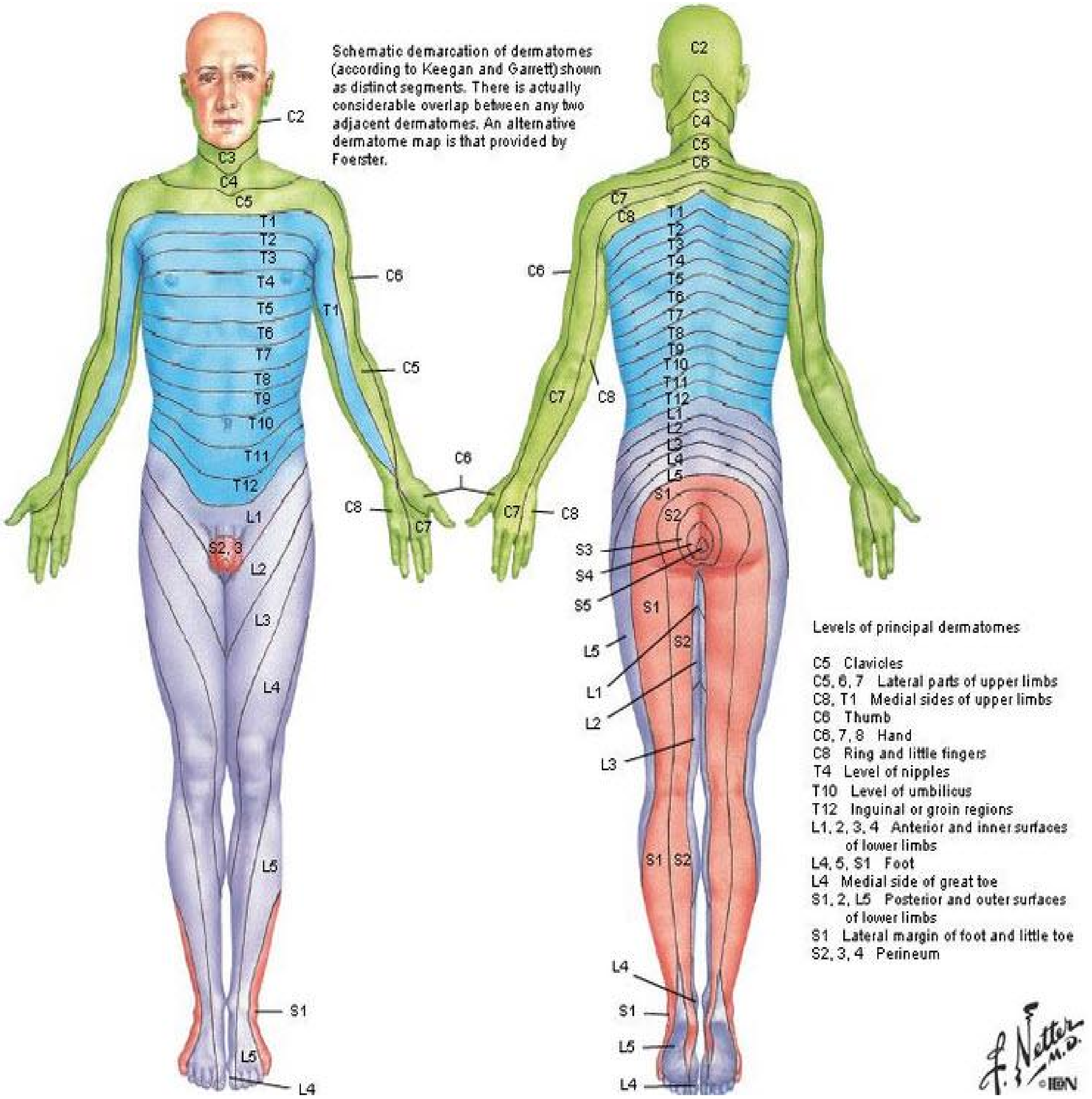

Figure 6: Dermatomal map or spinal nerve pathways

(Source: Avni. (2002).

2.2 Conceptual Clarification of Non-Specific Chronic Low Back Pain

Non-specific chronic low back pain (NSCLBP) is defined as pain localized between the lower rib margins and the gluteal folds, persisting for more than 12 weeks, without a specific underlying pathology identifiable through imaging or clinical tests (Balagué *et al*., 2012). Unlike specific low back pain that may result from spinal tumors, infections, or fractures, NSCLBP is often idiopathic and diagnosed after the exclusion of red flags. The pain may vary in intensity and can radiate, but it is not associated with nerve root compression or spinal abnormalities detectable on imaging.

Diagnosis primarily depends on a thorough patient history, physical examination, and the absence of indicators pointing to serious spinal pathology, such as malignancy or inflammatory disorders (Balagué *et al*., 2012; Maher *et al*., 2017). According to the National Institute for Health and Care Excellence (NICE, 2020), diagnostic workup should avoid overreliance on imaging in the early stages unless red flags are present, due to the high prevalence of incidental findings that may not correlate with symptoms. Clinical guidelines emphasize ruling out specific causes before diagnosing NSCLBP, ensuring a standard, exclusion-based diagnostic pathway.

Moreover, the chronicity criterion pain duration exceeding three months is a core component in distinguishing chronic from acute or subacute forms. Chronicity not only affects the classification but also prognostication, as chronic low back pain tends to be more resistant to conventional treatments (Hartvigsen *et al*., 2018). The biopsychosocial model is now widely accepted in the clinical assessment of NSCLBP, integrating physical, psychological, and social factors that contribute to the patient's pain experience and disability.

2.2.1 Causes and Risk Factors

Although NSCLBP lacks a clearly identifiable structural cause, numerous contributing factors have been identified across biomechanical, psychosocial, and lifestyle domains.

Biomechanical contributors include poor posture, prolonged sitting, repetitive lifting, and inadequate ergonomic practices, which may cumulatively stress the lumbar spine and surrounding soft tissues (Oliveira *et al*., 2018). Muscular imbalances, such as weak core stabilizers or tight hamstrings, are also commonly implicated. These mechanical stressors, when prolonged, may lead to sensitization of the pain pathways even in the absence of tissue injury.

Psychosocial factors have been recognized as significant risk components in the development and persistence of NSCLBP. Anxiety, depression, job dissatisfaction, fear-avoidance beliefs, and low self-efficacy can exacerbate pain perception and reduce the likelihood of recovery (Pincus *et al*., 2020). For example, individuals with catastrophic thinking patterns are more likely to experience prolonged pain and disability. Socioeconomic factors such as low income and limited access to healthcare services may further complicate recovery and management, especially in low- and middle-income countries.

Lifestyle-related risk factors such as obesity, smoking, physical inactivity, and poor sleep quality also increase susceptibility to NSCLBP. Obesity contributes to mechanical loading of the spine, while smoking has been shown to impair tissue healing and reduce pain threshold (Shiri *et al*., 2019). Lack of regular physical activity can weaken spinal support structures, contributing to muscular deconditioning. These multifactorial influences underscore the necessity of individualized, multidimensional approaches in the prevention and management of NSCLBP.

2.2.2 Epidemiology and Burden

Non-specific chronic low back pain (NSCLBP) is a major public health issue worldwide, defined as pain lasting more than 12 weeks without an identifiable cause. In 2020, low back pain (LBP), including NSCLBP, affected approximately 619 million people globally, with projections estimating 843 million cases by 2050 due to population growth and aging (GBD

2021 Low Back Pain Collaborators, 2023). The age-standardized prevalence of LBP was 7.5% in 2017, slightly down from 8.2% in 1990, but NSCLBP contributes significantly to this burden due to its chronicity (Wu *et al*., 2020).

LBP, including NSCLBP, remains the leading cause of years lived with disability (YLDs), with 69 million YLDs in 2020, accounting for a substantial portion of global disability. The burden peaks in older age groups, particularly at 85 years, driven by risk factors such as obesity, smoking, and occupational ergonomic stressors, which contribute to nearly 40% of YLDs (GBD 2021 Low Back Pain Collaborators, 2023) NSCLBP imposes a significant socioeconomic burden, with costs in high-income countries like the United States reaching $100 billion annually due to healthcare expenses and lost productivity (Chang *et al*., 2024). In low- and middle-income countries, the economic impact is less quantified but substantial due to limited healthcare access and reliance on manual labor (Hoy *et al*., 2014).

In Nigeria, NSCLBP is a prevalent musculoskeletal condition, though data specific to its chronic form are limited compared to general LBP. A systematic review reported a lifetime prevalence of LBP in Nigeria at 47%, with annual prevalence at 57% and point prevalence at 39%, much of which transitions to NSCLBP due to delayed treatment (Bello & Adebayo, 2017). Among workers, particularly farmers and drivers, 12-month prevalence is high, often exceeding 50%, reflecting occupational risks (Bello & Adebayo, 2017).

NSCLBP contributes significantly to disability in Nigeria, with studies reporting high chronicity rates (up to 73.1% in some regions) due to factors like self-treatment, financial constraints, and poor healthcare access. The socioeconomic burden is notable, as NSCLBP restricts work capacity in a labor-intensive economy, leading to lost income and increased family strain (Emorinken *et al*., 2023). Limited access to physiotherapy and reliance on analgesia exacerbate chronicity, increasing the public health challenge (Emorinken *et al*., 2023).

In Edo State, South-South Nigeria, data on NSCLBP are primarily derived from hospital-based studies. A study at Irrua Specialist Teaching Hospital reported a point prevalence of LBP at 20.2% among 1,580 patients, with 79.9% of these cases being chronic, indicating a high NSCLBP burden (Emorinken *et al.*, 2023). Prevalence peaks in the 51–60 age group and is higher in females (61.4%), reflecting biomechanical and psychosocial risk factors (Emorinken *et al.*, 2023).

The burden in Edo State includes significant disability, with 44.5% of LBP patients experiencing moderate disability and 15.4% severe disability, largely due to NSCLBP (Emorinken *et al.*, 2023). Work-related factors, such as poor ergonomics among farmers and traders, and lifestyle choices contribute to this burden. The socioeconomic impact is pronounced, as NSCLBP limits occupational productivity in rural communities, where manual labor predominates, and healthcare access is restricted (Ihegihu, 2022).

At UBTH, specific data on NSCLBP prevalence are scarce, but general LBP studies provide insight. NSCLBP is a common presentation in the outpatient physiotherapy department, driven by prolonged waiting times, resource constraints, and high patient loads. A hospital-based study in a similar Nigerian tertiary facility reported a high chronicity rate (82.1% for mechanical LBP, including NSCLBP), suggesting a comparable burden at UBTH (Omoke & Amaraegbulam, 2016). The socioeconomic impact is significant, as patients, often from working-class backgrounds, face lost wages and reduced quality of life due to limited access to timely physiotherapy (Omoke & Amaraegbulam, 2016). UBTH's role as a referral center amplifies this burden, as it serves a diverse population with complex NSCLBP cases.

2.3 Overview of Waiting Time in Healthcare

2.3.1 Definition and Classification of Waiting Time

Waiting time in healthcare refers to the duration a patient must wait from a defined starting point to receive a health service. In the context of outpatient physiotherapy, this can be measured from the moment the patient arrives at the clinic to when they are attended to by a physiotherapist. It is a critical indicator of healthcare quality and patient satisfaction, influencing health-seeking behavior, treatment compliance, and overall outcomes (WHO, 2023). Waiting time can be subdivided into several intervals, including pre-consultation time, in-clinic delay, and total service duration. The classification of waiting time is often contextual and varies depending on healthcare systems. Common classifications include:

Appointment waiting time (interval between scheduling and actual appointment),

Registration waiting time (time from arrival to registration),

Consultation waiting time (from registration to clinician interaction),

Treatment waiting time (from diagnosis to therapy initiation) (Afolabi *et al*., 2003).

Each of these phases provides critical insight into healthcare system efficiency and bottlenecks within hospital operations. A further classification can be made based on urgency and clinical needs. For instance, emergency, urgent, and elective cases are triaged differently, leading to varying wait times. In physiotherapy settings, elective musculoskeletal complaints typically experience longer delays compared to post-operative referrals due to prioritization protocols. Understanding these classifications helps healthcare administrators design interventions tailored to specific delays, thereby improving access to timely care (Fatoye *et al*., 2024).

2.3.2 Causes of Prolonged Waiting Times in Physiotherapy Clinics

Prolonged waiting times in physiotherapy clinics stem from a combination of systemic inefficiencies and resource constraints. A major contributor is the shortage of skilled physiotherapy personnel relative to patient demand. Many healthcare systems, especially in low- and middle-income countries (LMICs) like Nigeria, face challenges in recruiting and retaining qualified physiotherapists, leading to overburdened staff and limited appointment slots (Olatunji *et al*., 2024). This imbalance increases patient backlog and delays in accessing timely care.

Another significant factor is poor appointment scheduling systems and manual record keeping, which remain prevalent in many outpatient physiotherapy settings. The absence of digital health infrastructure contributes to administrative errors, patient mismanagement, and inefficient patient flow. Studies have shown that facilities using electronic booking and triage systems experience shorter waiting times and better coordination between departments (Wong *et al*., 2024). Without these, walk-in patients and previously scheduled clients often compete for limited time slots, causing further delays.

Infrastructure limitations, such as inadequate space for concurrent therapy sessions and limited availability of equipment, further compound delays. When physiotherapists are forced to operate under resource constraints, the throughput of patients is reduced. Also, delays in interdepartmental referrals and delays in insurance authorizations or billing processes can inadvertently contribute to increased waiting times (Obaseki, 2024). These multifactorial causes necessitate comprehensive policy and operational reforms for sustainable improvements.

2.3.3 Waiting Time Challenges in Nigerian Tertiary Hospitals

Waiting time challenges in Nigerian tertiary hospitals are deeply rooted in structural and operational deficiencies. Overcrowding, understaffing, and inefficient referral systems result in long queues, especially in urban teaching hospitals like the UBTH and Lagos University Teaching Hospital. A recent study revealed that patients in Nigerian tertiary hospitals often wait over 2 hours before receiving outpatient services, with physiotherapy clinics being among the most affected (IOSR-JDMS, 2021). These delays have adverse effects on patient satisfaction, especially among those with chronic pain who require routine care.

One major bottleneck is the lack of health information systems and centralized scheduling platforms. Unlike in advanced health systems where electronic medical records streamline referrals and appointments, most Nigerian public hospitals rely on paper-based systems. This results in duplication of efforts, frequent patient misplacement, and appointment conflicts (Adepoju & Opele, 2024). Consequently, patients are left waiting without real-time updates, and physiotherapists face difficulties in managing caseloads efficiently.

Moreover, government underfunding and poor hospital management practices further exacerbate the problem. Tertiary institutions face constant power outages, inadequate equipment maintenance, and poor facility upgrades, all of which reduce the capacity for timely service delivery. Policy-level neglect, especially towards allied health professions like physiotherapy, means staffing levels and infrastructure development often lag behind patient demand (Obaseki, 2024). Addressing these waiting time challenges requires a concerted effort involving digital transformation, workforce expansion, and systemic health financing reforms.

2.4 Clinical Outcomes Associated with Chronic Low Back Pain

2.4.1 Pain Intensity

Pain intensity is one of the most immediate and commonly reported outcomes in individuals with NSCLBP. It is often measured using validated scales such as the VAS and the Numeric Rating Scale (NRS), which provide subjective assessments of the patient's perceived pain level (Thong *et al*., 2018). Pain intensity in NSCLBP patients tends to fluctuate based on physical activity, posture, and psychosocial stressors. Research has shown that patients with NSCLBP often experience moderate to severe levels of pain that interfere with daily living, with higher pain levels associated with longer durations of disability and greater healthcare utilization (Maher *et al*., 2017). Pain intensity not only affects physical functioning but also plays a critical role in emotional and psychological well-being. Persistent pain can contribute to the development of anxiety, depression, and fear-avoidance behaviors, where patients begin to avoid physical activity due to fear of worsening their condition (Wertli *et al*., 2014). This avoidance often leads to deconditioning, muscular weakness, and further increases in pain perception, forming a vicious cycle of pain and disability.

Recent studies emphasize that pain intensity in NSCLBP is not solely a result of tissue damage but is influenced by central sensitization and altered pain processing mechanisms (Nijs *et al*., 2021). Central sensitization refers to an amplification of neural signaling within the central nervous system, which leads to increased pain sensitivity and persistence of pain even after the resolution of the initial injury. This phenomenon contributes significantly to the chronicity and intensity of low back pain and explains why some patients experience disproportionate pain responses to minor stimuli or physical examinations (Nijs *et al*., 2021).

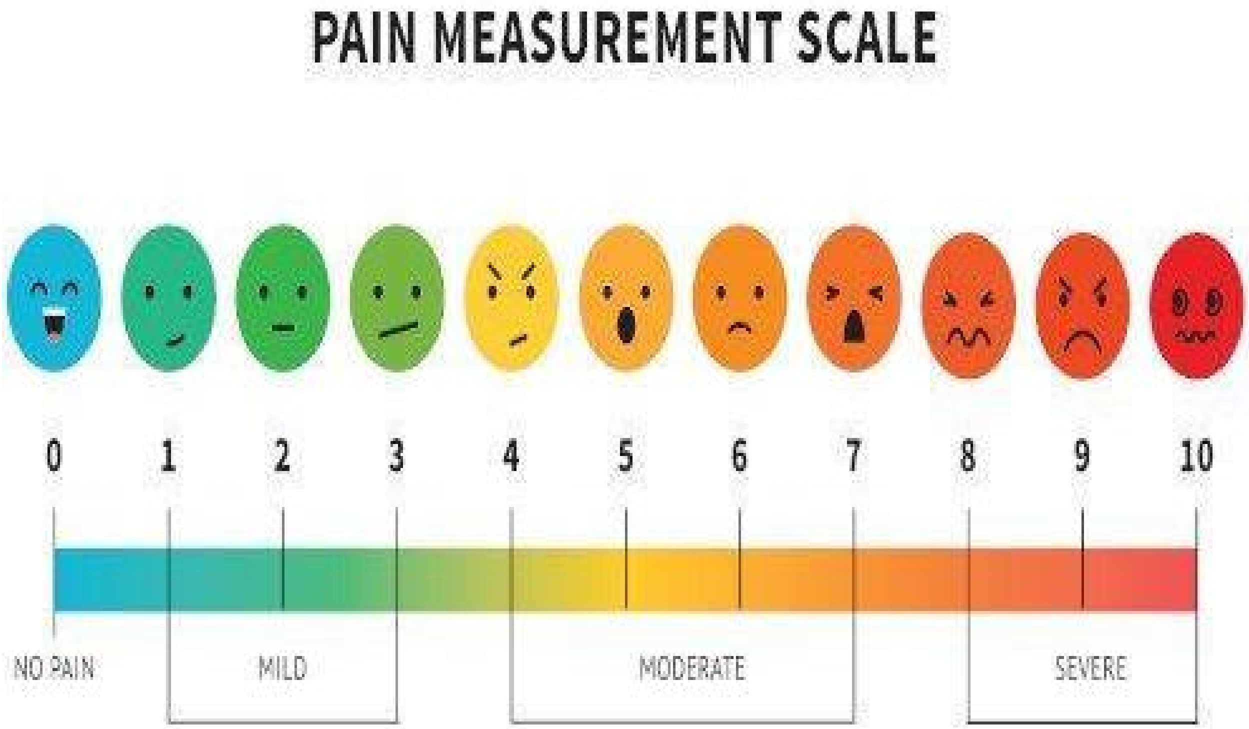

Figure 7: Pain scale (VAS/NPRS) with descriptors

(**Source:** Tamrin, S.. (2024).

Pain intensity is a critical determinant of treatment outcomes and is closely linked with other clinical manifestations such as sleep disturbances, reduced quality of life, and psychological distress. High baseline pain scores have been shown to predict poor treatment response and increased risk of long-term disability (Correa *et al*., 2025). Interventions aimed at reducing pain intensity, such as multimodal physiotherapy, cognitive-behavioral therapy, and pharmacological management, have been shown to offer varying levels of success, often depending on individual pain profiles and comorbidities.

2.4.2 Functional Disability

Functional disability refers to limitations in performing activities of daily living (ADLs) due to NSCLBP and is commonly evaluated using instruments like the Oswestry Disability Index (ODI) or Roland-Morris Disability Questionnaire (RMDQ). Individuals with NSCLBP frequently report difficulty with tasks such as lifting, walking, and prolonged sitting, which directly affects their ability to work and maintain social participation (Costa *et al*., 2008). Functional impairment in NSCLBP not only reduces the quality of life but also contributes to socioeconomic burdens due to lost productivity and increased healthcare costs.

The degree of functional disability often correlates with the severity and duration of pain, but psychological and behavioral factors also play crucial roles. For instance, fear-avoidance behaviors, where patients refrain from movement due to the fear of pain or injury, can lead to deconditioning and further loss of function (Osuka *et al*., 2024). This cycle perpetuates physical inactivity and muscular weakness, exacerbating disability over time. Studies have shown that patients with high levels of kinesiophobia tend to report greater disability irrespective of the objective findings on physical examination or imaging (Wertli *et al*., 2014).

Rehabilitation strategies that include graded activity, functional retraining, and patient education have shown promise in reducing disability among NSCLBP patients. Multidisciplinary approaches that address both physical and psychological aspects tend to yield better functional outcomes. For instance, structured exercise programs combined with cognitive-behavioral therapy have been found to improve both disability scores and return-to-work rates in NSCLBP patients (O'Sullivan *et al.*, 2015). Thus, managing functional disability requires a holistic, patient-centered approach rather than focusing solely on pain relief.

2.4.3 Coping Strategies

Coping strategies refer to the methods individuals use to manage the physical and emotional challenges of NSCLBP. These strategies can be adaptive, such as problem-focused coping and exercise, or maladaptive, such as avoidance and catastrophizing (Figure 8). Research has consistently shown that the type of coping mechanism employed significantly influences clinical outcomes, including pain intensity, psychological well-being, and functional status (Linton & Shaw, 2011).

Catastrophizing, a maladaptive strategy characterized by excessive negative thoughts about pain, is particularly associated with poor outcomes. It has been linked to higher pain severity, increased disability, and greater emotional distress (Simic *et al.*, 2024). Patients who catastrophize often anticipate the worst possible outcomes, which heightens their perception of pain and can undermine adherence to rehabilitation programs. Addressing maladaptive coping through cognitive-behavioral interventions is therefore crucial in the comprehensive management of NSCLBP.

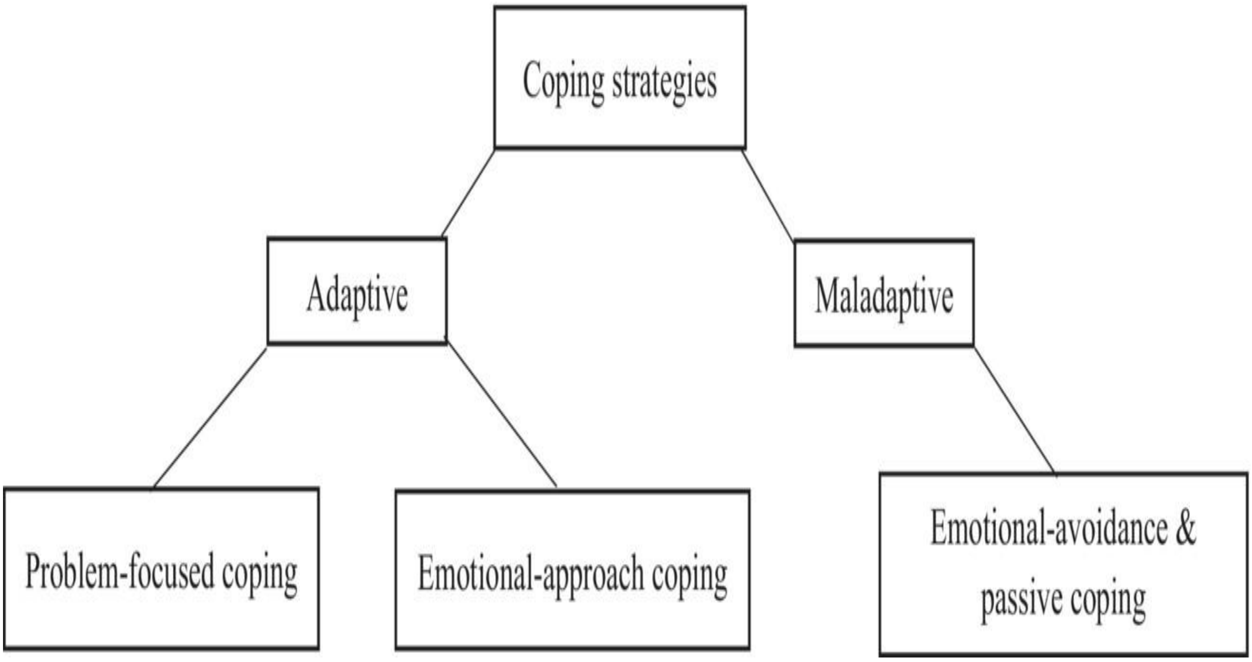

Figure 8: Patient coping strategy for low back pain

(Source: Rebecca *et al.*, 2024)

On the other hand, positive coping mechanisms like self-efficacy and acceptance have been shown to buffer the negative effects of chronic pain. Psychological interventions that foster these attributes such as Acceptance and Commitment Therapy and mindfulness-based stress reduction have demonstrated significant improvements in pain acceptance, reduced distress, and improved functionality (Vowles *et al*., 2011). These findings suggest that encouraging adaptive coping mechanisms is essential in helping patients manage the long-term implications of NSCLBP.

2.4.4 Psychological Impact

Non-specific chronic low back pain is strongly associated with adverse psychological outcomes, particularly anxiety and depression. The persistent nature of the pain, coupled with functional limitations and often inadequate pain relief, contributes to emotional distress in many patients (Nicholas *et al*., 2011). Epidemiological data indicate that up to 60% of individuals with NSCLBP exhibit symptoms of depression, while anxiety disorders are also prevalent, especially among those with longer pain durations (Nicholas *et al*., 2011). These psychological conditions can exacerbate pain perception and negatively influence treatment outcomes.

The relationship between pain and psychological health is bidirectional. Chronic pain can lead to mood disturbances, and conversely, anxiety and depression can heighten the perception of pain through altered neurochemical pathways (Yao *et al*., 2023). Neuroimaging studies have identified changes in brain regions associated with mood and affect regulation in NSCLBP patients, further supporting the intertwined nature of pain and psychological processes. These findings underscore the importance of early screening and integrated management of psychological comorbidities in this patient population (Yao *et al*., 2023).

Incorporating mental health interventions into physiotherapy and pain management programs has proven beneficial. Psychological therapies such as cognitive-behavioral therapy, interpersonal therapy, and mindfulness-based approaches can reduce depressive symptoms and anxiety, thereby improving overall quality of life (Simic *et al*., 2024). Interdisciplinary care models that address both physical and psychological dimensions of NSCLBP are increasingly recognized as the gold standard for improving outcomes in affected individuals.

2.4.5 Patient Satisfaction

Patient satisfaction is an important outcome in the management of NSCLBP, reflecting the individual's perception of care quality, provider communication, and symptom improvement. High levels of patient satisfaction are often associated with better adherence to treatment, improved functional outcomes, and reduced healthcare utilization (Nicholas *et al*., 2011). In the context of NSCLBP, satisfaction is influenced not only by pain relief but also by how well patients feel supported, informed, and engaged in their care decisions.

Effective communication between healthcare providers and patients is a key determinant of satisfaction. Patients who perceive that their clinicians listen attentively, provide clear explanations, and involve them in decision-making are more likely to report positive experiences, even in the absence of complete pain resolution (Kwame & Petrucka, 2021). Empathy and trust in the therapeutic relationship can enhance treatment engagement and foster realistic expectations, which in turn boost satisfaction levels.

Furthermore, individualized care plans that address patients' unique needs and preferences have been linked to higher satisfaction rates. Multidisciplinary pain management programs that incorporate physiotherapy, psychosocial support, and education tend to yield better satisfaction than unimodal approaches (Kamper *et al*., 2015). As healthcare moves toward value-based care, understanding and prioritizing patient satisfaction as a legitimate clinical outcome becomes crucial for improving overall care quality and patient retention in chronic pain management programs.

2.5 Conceptual Framework

Understanding the theoretical underpinnings that link waiting time and health outcomes is essential for guiding health policy and clinical decision-making, particularly in managing chronic conditions such as NSCLBP. Several models have been proposed to explain how access delays influence patient behavior, treatment pathways, and clinical outcomes. These frameworks highlight how waiting time serves not just as a logistical challenge but also as a determinant of health service utilization, patient satisfaction, and overall health outcomes. In musculoskeletal physiotherapy, these delays may exacerbate pain, increase disability, and reduce functional recovery rates (Deslauriers *et al*., 2021). Therefore, integrating theoretical perspectives enables a nuanced analysis of both individual and systemic factors involved in health service delivery.

2.5.1 Andersen's Behavioral Model of Health Services Use

Andersen's Behavioral Model of Health Services Use provides a comprehensive framework for understanding factors that influence healthcare utilization, particularly how predisposing, enabling, and need-based factors affect a person's decision to seek care (Andersen, 1995; Babitsch *et al*., 2012). In the context of NSCLBP and physiotherapy waiting time, this model explains how individual characteristics (e.g., age, gender, beliefs), community resources, and the perceived severity of symptoms can interact to influence care-seeking behavior. Patients experiencing long wait times may delay or avoid seeking care altogether, leading to the worsening of their conditions.

The enabling component of Andersen's model emphasizes the role of healthcare accessibility, including the availability of physiotherapists, clinic scheduling efficiency, and geographic proximity to services. These structural factors can significantly influence a patient's ability to obtain timely care for low back pain. A prolonged waiting period might shift patients toward alternative, and sometimes less effective, treatment options such as self-medication or traditional therapies (Ezekwesili-Ofili & Ogbonna, 2022). These choices, in turn, may worsen the clinical trajectory of chronic low back pain.

The "need" factor in Andersen's model both the perceived and evaluated, plays a crucial role in prioritizing health services. Patients with NSCLBP may perceive their condition as urgent due to functional limitations and pain, but long waiting times may undermine their perceived value of physiotherapy interventions. As a result, patient dissatisfaction and poor adherence to treatment plans may arise. This aligns with findings by Worlitz *et al*. (2020), who observed that perceived need decreases with extended delays, reducing motivation for follow-up and negatively influencing long-term health outcomes.

2.5.2 Delay-Outcome Relationship Model in Musculoskeletal Disorders

The Delay-Outcome Relationship Model posits a direct and often dose-dependent relationship between treatment delay and negative clinical outcomes in musculoskeletal disorders. This model is especially relevant for NSCLBP, where early intervention is known to prevent chronicity and functional deterioration (Foster *et al*., 2018). The model emphasizes the importance of prompt assessment and timely therapeutic engagement to mitigate the biological and psychosocial consequences of delayed care. Waiting time becomes a critical factor in disease progression, with delays often resulting in increased pain intensity, muscle deconditioning, and psychological distress.

In physiotherapy, especially within low-resource settings like Nigeria, prolonged waiting times may compromise the window of opportunity for effective early rehabilitation. According to Foster *et al*. (2018), patients who begin treatment within four weeks of symptom onset are significantly more likely to experience positive functional outcomes compared to those who start later. Delays beyond this window may allow for the reinforcement of maladaptive pain behaviors and reduced responsiveness to conventional interventions. This model thus provides a theoretical lens through which the urgency of addressing wait times in physiotherapy clinics can be justified.

Moreover, this framework helps guide health system redesign by identifying delay-sensitive conditions that necessitate prioritization. It supports the establishment of triage systems and early screening protocols in musculoskeletal care pathways. By categorizing patients based on urgency and likely outcomes, healthcare facilities can reduce unnecessary suffering and optimize resource allocation (Foster *et al*., 2018). In the context of NSCLBP, where long-term disability can result from early neglect, the delay-outcome model strengthens the argument for reducing physiotherapy waiting times as a cost-effective and clinically necessary strategy.

2.7 Gaps in Literature

2.7.1 Limited Research in Physiotherapy

Research exploring the effect of waiting time on clinical outcomes has gained traction globally; however, there remains a scarcity of focused studies in the field of physiotherapy, especially regarding chronic musculoskeletal conditions such as NSCLBP. Unlike in general medicine or surgical specialties, where appointment delays are frequently linked to adverse patient outcomes, physiotherapy services are often overlooked despite their critical role in pain management, mobility improvement, and long-term rehabilitation. According to Campbell *et al*. (2022), early intervention is vital in reducing symptom severity in musculoskeletal disorders, yet physiotherapy often faces understudied delays that may compromise its effectiveness.

Existing literature tends to generalize findings from other specialties or healthcare systems, with insufficient attention given to the distinct treatment protocols, appointment structures, and therapeutic timelines of physiotherapy care. For instance, physiotherapy sessions are typically structured across multiple visits over several weeks, making early access crucial for maintaining continuity and optimizing recovery. When access is delayed, the cascade of missed opportunities for functional progress is rarely documented in existing studies. Maher *et al*. (2017) emphasized that even short delays can diminish the momentum of intervention, potentially altering the clinical trajectory in patients with NSCLBP. This omission reflects a significant blind spot in health service research.

In the context of chronic pain, delayed physiotherapy may also negatively influence patient perceptions of care, motivation, and adherence to treatment plans. These psycho-behavioral outcomes are often underreported in studies examining waiting times. Odebiyi *et al*. (2021) highlight that the physiotherapy landscape in sub-Saharan Africa, including Nigeria, is already strained by limited human resources, making the impact of waiting periods even more critical. Despite these challenges, the lack of context-specific research continues to limit the ability of clinicians, administrators, and policymakers to design evidence-based interventions that address the unique needs of physiotherapy patients.

2.7.2 Inadequate Focus on Short-Term Outcomes

A predominant gap in current literature is the lack of focus on short-term outcomes resulting from delayed physiotherapy care. Most research in this area tends to assess long-term results, such as disability indices six months post-treatment or employment reintegration, which may obscure the importance of early gains made within the first few sessions. Kaltenborn *et al*. (2023) argued that evaluating early symptom relief, changes in pain severity, or initial improvement in mobility can provide a more sensitive measure of how treatment delays affect therapeutic efficacy. Yet, such short-term metrics remain underexplored, limiting practical insights into treatment timing and responsiveness.

The neglect of short-term outcomes is particularly problematic for managing NSCLBP, a condition characterized by fluctuating symptomatology that requires timely intervention for optimal control. Early improvements in pain or function are not just clinical milestones; they are essential motivators for patients to continue attending sessions and adhering to exercise regimens. A delay in care could mean lost momentum, reducing the patient's engagement and trust in the care process. Maher *et al*. (2017) noted that patients with rapid pain relief within the first two to three sessions had significantly better long-term outcomes, suggesting that the short-term phase is clinically important and warrants more investigative focus.

From a health system perspective, tracking short-term outcomes could support more dynamic scheduling strategies and patient flow management. In resource-limited settings like Nigeria, where waiting lists are common, data on short-term effects could help prioritize high-need patients and optimize therapist workloads. Akinpelu *et al*. (2022) emphasized that recognizing and capturing short-term clinical changes allows departments to measure intervention impact more efficiently and adjust protocols in real-time. Without this evidence, physiotherapy services may remain reactive rather than proactive, perpetuating inefficiencies in care delivery.

2.7.3 Contextual Gaps in Nigerian Tertiary Institutions

A significant body of literature on waiting time and clinical outcomes originates from high-income countries with well-resourced health systems, rendering the findings less transferable to the Nigerian context. Factors such as limited physiotherapy staffing, equipment shortages, and systemic inefficiencies are unique to many Nigerian tertiary institutions and affect both service delivery and patient experience (Obaseki, 2024). Most local research has focused on general outpatient delays rather than physiotherapy-specific waiting times, resulting in a lack of tailored evidence for a setting already burdened by delayed access and high disease prevalence.

Additionally, cultural and institutional perceptions of physiotherapy in Nigeria differ markedly from those in Western contexts. In some settings, physiotherapy is still perceived as non-essential or supplementary care, which affects its prioritization in public healthcare schedules. These contextual nuances influence waiting patterns, patient attitudes, and even health-seeking behaviors but are seldom addressed in existing literature. Odole *et al*. (2020). called attention to the need for local research that integrates socio-cultural variables into the evaluation of physiotherapy delays and outcomes, particularly in tertiary hospitals where services are overburdened and underfunded.

Nigerian institutions lack robust data management systems that can support longitudinal tracking of patient progress relative to appointment timing. This data gap makes it difficult to assess how waiting time influences short-term or long-term patient outcomes, especially in outpatient physiotherapy clinics. Akinpelu *et al*. (2022) underscored the need for evidence-based models tailored to Nigerian realities considering both infrastructure and human resource limitations to guide improvements in clinical scheduling and policy. The absence of this contextual data represents a critical gap in the literature and a missed opportunity for locally relevant, quality-enhancing intervention

2.8 Summary of Empirical Literature on Non-specific chronic low back pain, Effect of waiting time and Clinical outcome

A brief summary of some previous studies on NSCLBP, waiting time and their effects in individuals with Non-specific chronic low back pain are provided to guide understanding of the present study (Table 1)

Table 1: Summary of Empirical Literature on Effect of waiting time in patient with Non-Specific chronic Low Back Pain

Author(s)/year	Title (journal)	Background (scope)	Main results / findings
Arnold E. *et al*., 2019.	The Effect of Timing of Physical Therapy for Acute Low Back Pain on Health Services Utilization: A Systematic Review.	Systematic review of studies comparing early vs delayed PT for low back pain, focusing on downstream health-services utilization and resource use.	Early PT (commonly ≤30 days) was associated with reduced downstream health-service use (fewer opioids, injections, imaging, surgeries) and lower costs in several studies; effects on pain/disability were mixed.
Cattrysse E., 2024.	Impact of direct access on the quality of primary care musculoskeletal physiotherapy: a scoping review.	Scoping review of direct access (self-referral) to physiotherapy and its impact on access/waiting times and outcomes for MSK conditions.	Direct access models shorten waiting times and reduce primary care use; evidence suggests similar or improved patient-reported outcomes and satisfaction, supporting access pathways that reduce waits.

Deslauriers S. *et al.*, 2021.	Effects of waiting for outpatient physiotherapy services in persons with musculoskeletal disorders: a systematic review. (Disability & Rehabilitation)	Systematic review investigating clinical and health-system outcomes associated with waiting for outpatient physiotherapy across MSK disorders.	Mixed-quality evidence: longer waits were often linked to worse pain, disability, quality of life and psychological symptoms, and to higher downstream healthcare utilisation and costs; authors call for higher-quality longitudinal studies.
Di Renna T., 2024.	Improving access to chronic pain care with central referral triage models: a review and program description.	Review and program evaluation of central triage/referral pathways designed to reduce waits for chronic pain services.	Centralized triage and urgency-based pathways can reduce wait times for higher-priority patients; long waits persist for many and are linked to worsened patient distress and service burdens.
Elsharydah A., 2022.	Decreasing waiting time for new patients at a community pain clinic: a quality improvement report.	Empirical QI report reviewing interventions to reduce waiting times for community pain clinics and measuring effects on patient	Service redesign (triage, group education, scheduling changes) reduced waits and improved access; long waits were previously associated with poorer mental health and

		outcomes and access.	higher service use while waiting.
Gallotti M., 2023.	Effectiveness and consequences of direct access in musculoskeletal physiotherapy: systematic review.	Systematic review of direct-access physiotherapy (which reduces waits) and effects on outcomes, costs and healthcare utilization.	Direct access reduced time to treatment and primary care contacts; outcomes were generally comparable or better versus physician-led pathways, implying that reducing waits via DA can improve efficiency and patient experience.
Hussenbux A., 2015.	Intermediate care pathways for musculoskeletal conditions: a review.	Narrative/systematic synthesis of "intermediate care" (triage/physio-led clinics) aimed at reducing waits for orthopaedic/MSK care.	Intermediate care improves timely access, appropriate referral and often reduces waiting times and unnecessary specialist referral — leading to better early management of MSK problems.
Jentzsch T., 2024.	The clinical course of symptoms during wait time for lumbar interventions.	Analysis/review of symptom trajectories in patients while waiting for lumbar interventions (includes non-specific LBP and degenerative	Symptom trajectories are heterogeneous: some patients remain stable; many worsen during prolonged waits; longer waits were associated with worse pre-op status and sometimes poorer

		conditions).	short-term outcomes after intervention.
Lynch ME. *et al.*, 2008.	A systematic review of the effect of waiting for treatment for chronic pain.	Classic, high-impact systematic review of studies on the effect of waiting for chronic pain treatment on clinical outcomes.	Concluded that waits ≥6 months are associated with clinically important deterioration and are medically unacceptable in many cases; recommended reducing waits and further research.
MacIntyre E. *et al.*, 2024.	Waiting in Pain II: updated analysis of persistent pain services and waiting times in Australia.	National review updating staffing, capacity and waiting-time data for multidisciplinary persistent pain services.	Despite service growth, long waits (often >6 months) remain common; long waits correlate with inequitable access and worse patient experience—authors recommend system change to shorten waits.
Marrache M. et lal., 2022.	Initial presentation for acute low back pain: is early physical therapy associated with lower health-care utilization?	Large observational analysis and review addressing timing of first PT visit after LBP presentation and downstream outcomes.	Early PT was associated with lower 30-day and 1-year healthcare utilization and LBP-related spending (less imaging, fewer referrals). Relevant to wait-time policy for early access.

McDevitt AW. *et al*., 2023.	Effect of physical therapy timing on patient-reported outcomes for individuals with acute low back pain: systematic review & meta-analysis.	Systematic review & meta-analysis of RCTs and cohort studies testing early vs delayed PT for acute LBP and patient-reported outcomes.	Early PT vs non-PT care: small statistically significant short-term reductions in pain/disability (up to ~6 weeks); no consistent long-term benefit (≥6 months). Findings imply modest short-term value of early access.
Murtagh S., 2024.	Physiotherapy outcomes are associated with shorter waiting times: a service evaluation/systematic analysis.	Service-level analysis & review linking wait length and physiotherapy outcomes across MSK conditions.	Shorter waiting times, more treatment sessions and younger age correlated with better physiotherapy outcomes; supports reducing waits for improved clinical gains.
Özden F., 2024.	The effect of early rehabilitation after lumbar spine surgery: a systematic review.	Systematic review of timing of post-operative rehabilitation and its effect on pain, disability and QoL after lumbar surgery.	Early rehabilitation improved disability and some short- to mid-term pain outcomes (1–6 months); evidence limited for long-term QoL/psychosocial outcomes. Implication: timing matters for early recovery phases.
Ruffilli A., 2024.	Unveiling timetable for physical therapy after single-level lumbar	Systematic review synthesizing when to start PT after lumbar	Earlier PT initiation showed benefits for early disability reduction; timing windows varied

	surgery: systematic review & meta-analysis.	surgery and related functional outcomes.	across studies — overall supports earlier rehabilitation for faster short-term functional gains.

CHAPTER THREE

METHODS

3.1 Participants

The study involved adult patients diagnosed with NSCLBP who are receiving care at the physiotherapy outpatient department of UBTH, Benin City, Edo State, Nigeria.

3.1.1 Inclusion Criteria

The inclusion criteria for the study were as follows:

i. Patients aged 18 years and above.
ii. Diagnosed with NSCLBP of at least 12 weeks' duration.
iii. Scheduled for routine outpatient physiotherapy sessions at UBTH.
iv. Capable of providing informed consent.

3.1.2 Exclusion Criteria

The exclusion criteria for the study were as follows:

i. Patients with specific spinal pathologies (e.g., malignancy, infections, spinal fractures).
ii. Patients with neurological deficits or severe systemic conditions affecting mobility.
iii. Patients receiving other forms of treatment concurrently
iv. Individuals unable to comprehend or complete the research instrument due to language or cognitive impairments

3.2 Materials

3.2.1 Apparatus/Instruments

The Visual Analogue Scale: A VAS is a tool used to measure characteristics or attitudes that are believed to exist on a continuum and cannot be easily quantified directly (Gould, Kelly, Goldstone & Gammon, 2001). For instance, the intensity of pain a patient experiences can vary from no pain to extreme pain (Gould *et al*., 2001). The VAS was developed to represent this continuous nature of such experiences (Gould *et al*., 2001). Operationally, a VAS consists of a 100 mm horizontal line with descriptive words at either end (Gould *et al*., 2001) (Appendix IV). Patients will indicate on the line the point that they feel corresponds to their current level of pain (Gould *et al*., 2001). The VAS score will then be determined by measuring the distance in millimetres from the left end of the line to the mark made by the patient (Gould *et al*., 2001).

In addition to providing a ratio scale of measurement, the VAS also meets other important criteria for effective assessment (Price, Staud & Robinson, 2012). These include high reliability and repeatability over time (Price *et al*., 2012), consistent results across clinical and experimental pain contexts (Price *et al*., 2012), and sensitivity to changes in pain intensity (Price *et al*., 2012). Moreover, it can capture various dimensions of pain and is strongly linked to brain activity related to pain perception (Price *et al*., 2012). Whether using mechanical or electronic forms, the VAS is also noted for its simplicity and ease of use (Price *et al*., 2008).

The VAS provides a ratio level of measurement and meets key criteria for effective clinical assessment. It demonstrates high reliability and validity across diverse pain measurement contexts. Specifically, studies report strong test–retest reliability ($r = 0.97$, $p < 0.001$) and excellent construct validity, as VAS scores correlate highly with numerical and verbal pain rating scales (Price, Staud & Robinson, 2012; Bijur, Silver & Gallagher, 2001). The VAS is also sensitive to small changes in pain intensity and has shown excellent responsiveness in both clinical and research settings (Price *et al*., 2012). Furthermore, whether in mechanical or electronic forms, it is recognized for its simplicity, ease of use, and minimal respondent burden (Price *et al*., 2008).

Satisfaction Level Score

To assess satisfaction, patients will be asked to assign a score between 0 and 100, representing their perception of the visit time, where 0 indicates extreme dissatisfaction and 100 denotes complete satisfaction. This method provides a direct measure of patient satisfaction with the physiotherapy experience. The satisfaction rating scale has been shown to possess good face and content validity, as it directly captures patients' subjective evaluations of their healthcare experiences (Hawthorne, 2006) (Appendix V). Studies have also demonstrated high internal consistency (Cronbach's $\alpha > 0.85$) and acceptable test–retest reliability ($r = 0.78$–0.92) in assessing service satisfaction in outpatient settings (Hawthorne, 2006; Ware *et al*., 1983). Its simplicity and intuitive scoring make it a valid tool for comparing satisfaction levels across different patient populations.

The Coping Strategy Questionnaire 24

Coping Strategy Questionnaire 24 is a shortened version of the original coping strategy questionnaire, which is among the most established and widely studied tools for assessing coping mechanisms (Harland & Ryan, 2013) (Appendix VI). Its reliability over time has been well documented. Unlike other tools that primarily focus on negative constructs such as fear, the CSQ24 is unique in its ability to also assess a positive construct specifically, cognitive coping (Harland & Ryan, 2013). As the absence of a negative construct does not necessarily mean the presence of a positive construct and when identification of patients at the lowest risk of poor outcome is a goal, a tool identifying both negative and positive constructs is at least conceptually advantageous (Harland & Ryan, 2013).

In terms of psychometric properties, the CSQ-24 has demonstrated high internal consistency, with Cronbach's alpha coefficients ranging from 0.72 to 0.86 across its subscales (Harland & Ryan, 2013). It also shows excellent test–retest reliability ($r = 0.80$ over 2 weeks) and construct validity, supported by significant correlations with measures of pain intensity, disability, and psychological distress (Harland & Ryan, 2013; Jensen *et al*., 1991). The CSQ-24 is therefore both a reliable and valid tool for evaluating coping strategies in chronic pain populations.

Digital stopwatch

A digital stopwatch will be employed to accurately measure waiting time and other time-dependent variables throughout the study. The stopwatch allows for the precise recording of time intervals in seconds and minutes, ensuring accurate quantification of each participant's waiting duration prior to the initiation of physiotherapy intervention. Stopwatches are widely recognized as essential instruments for the objective measurement of temporal variables in clinical and experimental research. The precision of digital stopwatches, often accurate to within ±0.01 seconds, enhances the reliability of temporal data collection (Hopkins, 2000). Their use minimizes observer bias, as time readings can be started and stopped instantaneously, providing consistency in data acquisition across participants.In terms of reliability**,** digital stopwatches have demonstrated excellent inter-rater and test–retest reliability**, w**ith intraclass correlation coefficients (ICCs) frequently exceeding 0.98 in repeated timing tasks (Atkinson & Nevill, 1998). This high degree of consistency ensures that time measurements are replicable and free from significant measurement error.

Regarding validity, stopwatches possess strong criterion validity when compared with automated electronic timing systems, showing negligible mean differences (less than 0.1 seconds) in controlled trials (Hopkins, 2000; Mayhew, 2002). This supports their validity as a cost-effective and dependable alternative to more sophisticated timing systems in clinical and rehabilitation research contexts. Furthermore, the simplicity of stopwatch operation ensures face validity, as it directly measures the construct of interest; time elapsed without requiring inferential interpretation.

3.3 Methods

3.3.1 Sampling Technique

The study employed a Convenience sampling technique to recruit eligible participants until the target sample size was met.

3.3.2 Sample Size

The formula by Chan (2003): $n=c \times \pi_1 (1-\pi_1) + \pi_2 (1-\pi_2)/(\pi_1-\pi_2)^2$ which assumes a type 1 error and a power of 80% was used to determine the sample size. For a two-sided test of 5%, assuming a successful outcome of 25% in one intervention will only be relevant if we observe a 40% effect size of absolute improvement in the other intervention. Therefore: n= sample size, $\pi_1=0.25$, $\pi_2=0.65$, c= the power of the sample (c= 7.9 for the power of 80%). $n= 7.9 \times 0.25 (1- 0.25) +0.65 (1- 0.65)/ (0.25-0.65)^2= 21$. For the two groups of participants, $n=2\times21=42$. Assuming 20% drop out, $n = 42\times 1.25= 52.5$

However, 60 participants will be recruited such that there will be 26 participants for each group hence, group one will be 30, group two will be 30

3.3.4 Research Design

The study employed a repeated measures design

3.3.5 Ethical Considerations

Ethical approval was obtained from the Ethics and Research Committee of UBTH with (Registration Number: NHREC-UBTH-HREC/24/12/2022B) (Appendix I). All participants were provided with written informed consent before enrollment. Participation was voluntary, and anonymity was maintained using unique codes instead of names. Participants was informed of their right to withdraw from the study at any time without consequences.

3.3.6 Procedure for Data Collection

The data collection process began after obtaining ethical approval from the Ethics and Research Committee of UBTH. The researcher oversaw the data collection process to ensure consistency and maintain blinding of clinicians. To ensure blinding, only the participants were fully aware of the study procedures. They were assessed before the intervention, immediately before the intervention began, and immediately after the intervention to obtain their consent to participate. The clinicians were only informed that participants would be assessed immediately before and after each intervention session. They were unaware that participants had previously been assessed for baseline characteristics related to the clinical outcomes.

Eligible patients were identified prospectively during their scheduled outpatient physiotherapy visits at the UBTH Physiotherapy Outpatient Department. Upon arrival at the clinic, the research assistant approached potential participants, provided a detailed explanation of the study, and

emphasized that it aimed to evaluate the general effectiveness of physiotherapy for NSCLBP. After confirming eligibility based on the inclusion and exclusion criteria, written informed consent was obtained from each participant. Participants were informed of their right to withdraw from the study at any time without any consequences to their care. Clinical outcomes were measured immediately before and immediately after the intervention for each visit, and each participant was assessed once. During each visit, the researcher used a stopwatch to record the patient's arrival time at the clinic and the exact start time of their physiotherapy treatment. The waiting time was calculated as the difference between these two time points.

During each session, a structured, researcher-administered questionnaire was used to collect socio-demographic information, including age, sex, occupation, height, weight, and duration of symptoms. Clinical outcomes were assessed at baseline, immediately before intervention, and immediately after intervention using standardized tools: the VAS to measure pain intensity on a 0–10 scale; a satisfaction level score (0–100) to measure patient satisfaction; and the CSQ to assess coping strategies, including catastrophizing, diverting attention, cognitive coping, and pain reinterpretation. The same procedure was repeated for all eligible participants throughout the data collection period.

3.3.7 Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS, IBM version 27, M Corp., USA). Descriptive statistics of mean and standard deviation were used to summarize patients' waiting time, physical characteristics, pain intensity, and coping strategy scores, while frequencies and percentages were used to summarize sociodemographic characteristics and patient satisfaction. Paired t-tests were employed to compare pain intensity and coping strategy scores (catastrophising, diverting attention, reinterpretation of pain, and cognitive coping) before and after intervention. One-way multivariate analysis of variance (MANOVA) was used to determine the effect of actual waiting time on changes in clinical outcome variables, including pain intensity, pain catastrophising, diverting attention, reinterpretation of pain, and cognitive coping.

In addition, Pearson's correlation was used to determine the relationship between actual waiting time and both pre/post-treatment clinical outcomes as well as changes in these outcomes. A chi-square (χ^2) test was used to determine the association between waiting time and patient satisfaction. All statistical tests were carried out at a significance level of $p < 0.05$.

CHAPTER FOUR

RESULTS

4.1 Sociodemographic characteristics of participants

The sociodemographic characteristics of the participants are summarized in Table 2. The age distribution showed that 22 (36.7%) were within 20–39 years, 18 (30.0%) within 40–49 years, 12 (20.0%) within 50–59 years, and 8 (13.3%) within 60–69 years. There was an equal gender representation with 30 (50.0%) males and 30 (50.0%) females. Regarding marital status, 19 (31.7%) were single, while 41 (68.3%) were married. Concerning educational level, 1 (1.7%) had no formal education, 4 (6.7%) had primary education, 18 (30.0%) had secondary education, and 37 (61.7%) had tertiary education (Table 2).

In terms of employment, 1 (1.7%) participant was unemployed, 10 (16.7%) were employed in the public sector, 16 (26.7%) in the private sector, 27 (45.0%) were self-employed, and 6 (10.0%) were students. The duration of chronic low back pain revealed that 24 (40.0%) had pain for 3–6 months, 22 (36.7%) for 7–12 months, 9 (15.0%) for 1–2 years, and 5 (8.3%) for more than 2 years. A majority, 53 (88.3%), had received prior treatment, while 7 (11.7%) had not.

Concerning number of clinic visit, 22 (36.7%) visited the clinic once, 24 (40.0%) two to three times, 7 (11.7%) four to five times, and 7 (11.7%) more than five times. Most participants (44; 73.3%) waited for less than 30 minutes, while 16 (26.7%) waited 30 minutes to 1 hour. Regarding lifestyle factors, 51 (85.0%) were non-smokers, 9 (15.0%) were former smokers, 43 (71.7%) never consumed alcohol, 16 (26.7%) drank occasionally, and 1 (1.7%) drank frequently (Table 2).

Table 2: Sociodemographic characteristics of participants (N=60)

Variable	Frequency (n)	Percentage (%)
Age (years)		
20–39	22	36.7
40–49	18	30.0
50–59	12	20.0
60–69	8	13.3
Sex		
Male	30	50.0
Female	30	50.0
Marital Status		
Single	19	31.7
Married	41	68.3
Educational Level		
No formal education	1	1.7
Primary education	4	6.7
Secondary education	18	30.0
Tertiary education	37	61.7
Employment Status		
Unemployed	1	1.7
Employed (Public sector)	10	16.7
Employed (Private sector)	16	26.7
Self-employed	27	45.0
Student	6	10.0
Duration of chronic low back pain		
3–6 months	24	40.0
7–12 months	22	36.7
1–2 years	9	15.0
More than 2 years	5	8.3
Received Treatment prior to pain		
Yes	53	88.3
No	7	11.7
Number of clinic visit		
Once	22	36.7
2–3 times	24	40.0
4–5 times	7	11.7
More than 5 times	7	11.7
Average waiting time		
Less than 30 minutes	44	73.3
30 mins – 1 hour	16	26.7
Smoking Status		
Non-smoker	51	85.0
Former smoker	9	15.0

Alcohol consumption		
Never	43	71.7
Occasionally	16	26.7
Frequently	1	1.7

4.2 Physical characteristics of participants

The Physical characteristics of the participants are shown in Table 3. The mean height of participants was 1.68 ± 0.10 m, the mean weight was 76.03 ± 12.83 Kg, and the mean Body Mass Index (BMI) was 27.23 ± 5.07 Kg/m² (Table 3).

Table 3: Physical characteristics of participants (N=60)

Variable	Mean ± Standard Deviation
Height (m)	1.68 ± 0.10
Weight (Kg)	76.03 ± 12.83
BMI (Kg/m^2)	27.23 ± 5.07

BMI = Body Mass Index

4.3 Baseline clinical characteristics of participants

The baseline clinical characteristics of respondents are presented in Table 4. The mean pain intensity on arrival was 5.82 ± 1.35, while the mean pain intensity before treatment was 6.34 ± 1.42. The mean pain catastrophising score before treatment was 11.13 ± 5.34, the mean diverting attention score before treatment was 13.52 ± 5.69, the mean reinterpretation of pain score before treatment was 12.82 ± 5.31, and the mean cognitive coping score before treatment was 12.45 ± 5.94.

Table 4: Baseline clinical characteristics of participants (N = 60)

Variable	Mean ± Standard Deviation
Pain intensity on arrival	5.82 ± 1.35
Pain intensity pre-treatment	6.34 ± 1.42
Pain catastrophising pre-treatment	11.13 ± 5.34
Diverting attention pre-treatment	13.52 ± 5.69
Reinterpretation of pain pre-treatment	12.82 ± 5.31
Cognitive coping pre-treatment	12.45 ± 5.94

4.4 Comparison of pre- and post-treatment clinical outcomes

The comparison of pain intensity before and after intervention is presented in Table 5. The mean pain intensity on arrival was 5.82 ± 1.35, while the mean pain intensity before treatment was 6.34 ± 1.42. The mean difference was statistically significant ($p < 0.001$), indicating a slight increase in pain level prior to treatment. The mean pain intensity before treatment was 6.34 ± 1.42, while the mean pain intensity after receiving treatment was 2.98 ± 1.56. The mean difference was statistically significant ($p < 0.001$), reflecting a significant reduction in pain scores after the intervention. Furthermore, the comparison between pain intensity on arrival and post-treatment showed that the mean pain intensity decreased from 5.82 ± 1.35 to 2.98 ± 1.56, with a statistically significant mean difference ($p < 0.001$), indicating a marked improvement in pain after treatment (Table 5). The mean catastrophising score pre-treatment was 11.13 ± 5.34, while the mean catastrophising score after treatment was 12.80 ± 4.84. The mean difference was statistically significant ($p = 0.003$), indicating a significant difference in catastrophising scores following the intervention. The comparison of Diverting Attention scores is presented in Table 5. The mean Diverting Attention pre-treatment score was 13.52 ± 5.69, while the mean Diverting Attention post-treatment score was 15.92 ± 5.47. The mean difference was statistically significant ($p < 0.001$), indicating a significant improvement in diverting attention following the intervention. As shown in Table 5, the mean Reinterpretation of Pain score before treatment was 12.82 ± 5.31, while the post-treatment mean was 14.50 ± 4.33. The mean difference was statistically significant ($p = 0.002$), indicating an increase in reinterpretation of pain following the intervention. The mean Cognitive Coping score before treatment was 12.45 ± 5.94, while after treatment it was 13.20 ± 6.57. The mean difference was not statistically significant ($p = 0.286$), indicating no significant change in cognitive coping following the intervention

Table 5: Comparison of pre- and post-treatment clinical outcomes (N = 60)

Variable	Pre-treatment Mean ± SD (Pre)	Post-treatment Mean ± SD (Post)	MD	t-value	df
Pain intensity[1]	5.82 ± 1.35	6.34 ± 1.42	-0.52	-12.477	59
Pain intensity[2]	6.34 ± 1.42	2.98 ± 1.56	-3.35	-27.526	59
Pain intensity[3]	5.82 ± 1.35	2.98 ± 1.56	2.84	21.122	59
Pain catastrophising	11.13 ± 5.34	12.80 ± 4.84	1.67	3.109	59
Diverting Attention	13.52 ± 5.69	15.92 ± 5.47	2.40	4.098	59
Reinterpretation of pain	12.82 ± 5.31	14.50 ± 4.33	1.68	3.224	59
Cognitive Coping	12.45 ± 5.94	13.20 ± 6.57	0.75	1.076	59

Keys

Pain intensity [1] = Pain intensity on arrival vs pain intensity pre-treatment; Pain intensity[2] = Pain intensity pre-treatment vs pain intensity post-treatment; Pain intensity[3] = Pain intensity on arrival vs pain intensity post-treatment; MD = Mean Difference; df = Degree of freedom ***p* < *0.05 indicates significance***

4.5 Effect of actual waiting time on dependent variables

A statistically significant MANOVA effect was revealed for actual waiting time (Pillai's Trace = 1.495, F = 1.174, p = 0.176; Wilks' Lambda = 0.155, F = 1.196, p = 0.156; Roy's Largest Root = 0.993, F = 3.515, p = 0.001), indicating a significant multivariate difference in participants' clinical outcomes. Further univariate analysis showed that actual waiting time had a significant effect only on reinterpretation of pain (p = 0.006) (Table 6).

The results of the multivariate analysis are presented in Table 6. The analysis revealed that actual waiting time had no significant effect on body mass index (p = 0.420), or on the various measures of pain intensity, including changes between pain intensity on arrival and pre-treatment (p = 0.612), between pre-treatment and post-treatment (p = 0.583), and between arrival and post-treatment (p = 0.677). Similarly, actual waiting time had no significant effect on changes in pain catastrophising (p = 0.221), diverting attention (p = 0.116), or cognitive coping strategy (p = 0.700). However, a statistically significant effect was observed on changes in reinterpretation of pain (p = 0.006), with a Partial Eta Squared value of 0.434, indicating a moderate effect size (Table 6).

Table 6: Multivariate analysis of the effect of actual waiting time on dependent variables (N = 60)

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p-value	Partial Eta Squared
Actual waiting time	BMI	348.380	13	26.798	1.054	0.420	0.230
	Pain intensity[1]	1.180	13	0.091	0.846	0.612	0.193
	Pain intensity[2]	10.428	13	0.802	0.876	0.583	0.198
	Pain intensity[3]	11.518	13	0.886	0.780	0.677	0.181
	Pain catastrophising[1]	280.943	13	21.611	1.350	0.221	0.276
	Diverting attention[1]	380.438	13	29.264	1.614	0.116	0.313
	Reinterpretation of pain[1]	419.152	13	32.242	2.717	0.006*	0.434
	Cognitive coping[1]	302.610	13	23.278	0.756	0.700	0.176

Keys:

BMI = Body Mass Index; Pain intensity[1] = Changes in pain intensity on pre-treatment vs arrival; Pain intensity[2] = changes in Pain intensity post-treatment vs pre-treatment; Pain intensity[3] = changes in pain intensity post-treatment vs arrival; Pain catastrophising[1] = Changes in pain catastrophising post-treatment vs pre-treatment; Diverting attention[1] = Changes in Diverting Attention post-treatment vs pre-treatment; Reinterpretation of pain[1] = Changes in Reinterpretation of Pain post-treatment vs pre-treatment; Cognitive coping[1] = Changes in Cognitive coping post-treatment vs pre-treatment; ***p < 0.05 indicates significance***

4.6 Association between waiting time and patient satisfaction among patients with non-specific chronic low back pain

The relationship between actual waiting time and patient satisfaction is presented in Table 7. A total of 52 participants (86.7%) waited for less than 30 minutes, while 8 participants (13.3%) waited between 30 minutes and 1 hour. Among those who waited for less than 30 minutes, 21 (40.4%) reported being neutral or fair, 15 (28.9%) were satisfied, and 16 (30.8%) were very satisfied. In contrast, among those who waited between 30 minutes and 1 hour, 7 (87.5%) were dissatisfied, and only 1 (12.5%) was neutral or fair (Table 7).

A chi-square test revealed a statistically significant association between waiting time and patient satisfaction ($\chi^2 = 51.740$, df = 3, $p < 0.001$), indicating that shorter waiting times were associated with higher levels of patient satisfaction among individuals with non-specific chronic low back pain (Table 7).

Table 7: Association between waiting time and patient satisfaction among patients with non-specific chronic low back pain (N = 60)

Categorical Waiting Time	Dissatisfied	Neutral/Fair	Satisfied	Very Satisfied	(N=60)	χ^2	df	p-value
< 30 minutes	0 (0.00%)	21 (40.38%)	15(28.85%)	16 (30.77%)	52	51.740	3	0.000*
30 minutes – 1 hour	7 (87.50%)	1 (12.50%)	0 (0.00%)	0 (0.00%)	8			

4.7 Relationship between actual waiting time and pre/post-treatment clinical outcomes

The relationship between actual clinic waiting time and participants' pre- and post-treatment clinical scores is presented in Table 8. The analysis revealed that actual waiting time had no significant correlation with most pre- and post-treatment measures (Table 8). Specifically, actual waiting time showed weak, non-significant correlations with pain intensity on arrival ($r = –0.062$, $p = 0.639$), pain intensity before treatment intervention ($r = –0.026$, $p = 0.844$), and pain intensity after treatment intervention ($r = 0.156$, $p = 0.233$). Similarly, actual waiting time showed weak, non-significant correlations with pain catastrophising before treatment ($r = –0.063$, $p = 0.632$) and pain catastrophising after treatment ($r = –0.056$, $p = 0.669$).

In addition, actual waiting time had weak, non-significant correlations with diverting attention before treatment ($r = –0.195$, $p = 0.135$) and diverting attention after treatment ($r = –0.009$, $p = 0.944$), as well as reinterpretation of pain before ($r = –0.178$, $p = 0.173$) and after treatment ($r = –0.038$, $p = 0.775$). However, a weak but statistically significant positive correlation was found between actual waiting time and cognitive coping post-treatment ($r = 0.285$, $p = 0.027$), indicating that participants with longer waiting times demonstrated slightly higher cognitive coping scores after treatment.

Table 8: Relationship between actual waiting time and pre/post-treatment clinical outcomes (N = 60)

Variable Pair	Correlation (r)	p-value
Actual waiting time-pain intensity on arrival	−0.062	0.639
Actual waiting time vs pain intensity pre-treatment	−0.026	0.844
Actual waiting time vs pain intensity post treatment	0.156	0.233
Actual waiting time vs Pain catastrophising pre-treatment	−0.063	0.632
Actual waiting time vs Pain catastrophising post-treatment	−0.056	0.669
Actual waiting time vs Diverting attention pre-treatment	−0.195	0.135
Actual waiting time vs Diverting attention post-treatment	−0.009	0.944
Actual waiting time vs Reinterpretation of pain pre-treatment	−0.178	0.173
Actual waiting time vs Reinterpretation of pain post-treatment	−0.038	0.775
Actual waiting time vs Cognitive coping pre-treatment	0.075	0.567
Actual waiting time vs Cognitive coping post-treatment	0.285*	0.027*

4.8 Relationship between actual waiting time and changes in clinical outcome variables

The relationship between actual clinic waiting time and changes in clinical outcome variables is presented in Table 9. The analysis revealed that actual waiting time showed positive correlations with most of the change scores (Table 9). Specifically, actual waiting time showed a weak, non-significant correlation with Pain intensity 1 (r = 0.144, p = 0.272), which represents the change in pain intensity between arrival and pre-treatment. A statistically significant positive correlation was observed between actual waiting time and Pain intensity 2 (r = 0.297, p = 0.021), which represents the change in pain intensity between pre-treatment and post-treatment. Similarly, a significant positive correlation was found between actual waiting time and Pain intensity 3 (r = 0.314, p = 0.015), which represents the change in pain intensity between arrival and post-treatment.

In addition, actual waiting time showed weak, non-significant correlations with pain catastrophising (r = 0.016, p = 0.906), diverting attention (r = 0.233, p = 0.073), and reinterpretation of pain (r = 0.193, p = 0.139). However, a significant positive correlation was found between actual waiting time and cognitive coping (r = 0.264, p = 0.042), indicating that participants with longer waiting times demonstrated slightly higher improvements in cognitive coping strategies following treatment.

Table 9: Relationship between actual waiting time and changes in clinical outcome variables (N = 60)

Variable Pair	Correlation (r)	p-value

Actual waiting time vs Pain intensity[1]	0.144	0.272
Actual waiting time vs Pain intensity[2]	0.297*	0.021*
Actual waiting time vs Pain intensity[3]	0.314*	0.015*
Actual waiting time vs Pain catastrophising[1]	0.016	0.906
Actual waiting time vs Diverting attention[1]	0.233	0.073
Actual waiting time vs Reinterpretation of pain[1]	0.193	0.139
Actual waiting time vs Cognitive coping[1]	0.264*	0.042*

Keys

Pain intensity[1] = Changes in pain intensity on pre-treatment vs arrival; Pain intensity[2] = changes in Pain intensity post-treatment vs pre-treatment; Pain intensity[3] = changes in pain intensity post-treatment vs arrival; Pain catastrophising[1] = Changes in pain catastrophising post-treatment vs pre-treatment; Diverting attention[1] = Changes in Diverting Attention post-treatment vs pre-treatment; Reinterpretation of pain[1] = Changes in Reinterpretation of Pain post-treatment vs pre-treatment; Cognitive coping[1] = Changes in Cognitive coping post-treatment vs pre-treatment; ***$p < 0.05$ indicates significance***

4.9 Hypothesis Testing

Hypothesis 1

Statement: There would be no significant difference in pain intensity in patients with

NSCLBP before and after waiting for treatment.

Test Statistics: Paired t-test

Stated Level of Significance: $p \leq 0.05$

Observed p-value: $p < 0.001$

Decision: Since the observed p-value was less than the stated level of significance ($p < 0.05$), the null hypothesis was REJECTED. Hence, there was a significant difference in pain intensity before and after waiting for treatment, indicating that the intervention had a positive effect on reducing pain among patients with NSCLBP.

Hypothesis 2

Statement: There would be no significant association between patient waiting time for physiotherapy treatment and patient satisfaction after receiving treatment.

Test Statistics: Chi-square test

Stated Level of Significance: $p \leq 0.05$

Observed p-value: $p < 0.001$

Decision: Since the observed p-value was less than the stated level of significance ($p < 0.05$), the null hypothesis was REJECTED. Hence, there was a significant association between waiting time and patient satisfaction, indicating that shorter waiting times were linked with higher levels of satisfaction among patients with NSCLBP.

Hypothesis 3

Statement: There would be no significant difference in pain catastrophising in patients with

NSCLBP before and after waiting for treatment.

Test Statistics: Paired t-test

Stated Level of Significance: $p \leq 0.05$

Observed p-value: $p = 0.003$

Decision: Since the observed p-value was less than the stated level of significance ($p < 0.05$), the null hypothesis was REJECTED. Hence, there was a significant difference in pain catastrophising before and after waiting for treatment, suggesting that patients' catastrophising thoughts changed significantly following treatment.

Hypothesis 4

Statement: There would be no significant difference in diverting attention as a coping strategy in patients with NSCLBP before and after waiting for treatment.

Test Statistics: Paired t-test

Stated Level of Significance: $p \leq 0.05$

Observed p-value: $p < 0.001$

Decision: Since the observed p-value was less than the stated level of significance ($p < 0.05$), the null hypothesis was REJECTED. Hence, there was a significant difference in diverting attention as a coping strategy before and after waiting for treatment, indicating that patients improved in their use of distraction as a coping mechanism following treatment.

Hypothesis 5

Statement: There would be no significant difference in cognitive coping mechanisms in patients with NSCLBP before and after waiting for treatment.

Test Statistics: Paired t-test

Stated Level of Significance: $p \leq 0.05$

Observed p-value: $p = 0.286$

Decision: Since the observed p-value was greater than the stated level of significance ($p > 0.05$), the null hypothesis was NOT REJECTED. Hence, there was no significant difference in cognitive coping mechanisms before and after waiting for treatment, suggesting that the intervention did not significantly alter this coping dimension.

Hypothesis 6

Statement: There would be no significant difference in pain reinterpretation strategies in patients with NSCLBP before and after waiting for treatment.

Test Statistics: Paired t-test

Stated Level of Significance: $p \leq 0.05$

Observed p-value: $p = 0.002$

Decision: Since the observed p-value was less than the stated level of significance ($p < 0.05$), the null hypothesis was REJECTED. Hence, there was a significant difference in pain reinterpretation strategies before and after waiting for treatment, indicating that patients' ability to reinterpret their pain improved significantly following the intervention.

CHAPTER FIVE

DISCUSSION, CONCLUSION, RECOMMENDATIONS AND IMPLICATIONS

5.1 Discussion

5.1.1 Average waiting time of participants

This study found that most patients with NSCLBP at the outpatient physiotherapy department of the UBTH experienced a relatively short waiting time before receiving treatment. The majority were attended to within half an hour, while only a few waited up to one hour. This reflects an efficient service system that minimizes patient delays and promotes timely access to physiotherapy care. Shorter waiting periods likely contributed to reduced anxiety, improved satisfaction, and better engagement in therapy. These findings are supported by Zhang *et al*. (2023), who examined the effect of waiting time on patient satisfaction among outpatients in China. They found that *actual waiting time* did not have a direct significant effect on satisfaction, but perceived waiting time (how long patients felt they waited) strongly influenced satisfaction levels.

This suggests that beyond minimizing objective waiting duration, managing patient expectations and communication during waiting is crucial for improving service perception. In contrast, Lynch *et al*. (2008) conducted a systematic review in Canada and reported that extended waiting periods for chronic pain management (often spanning weeks or months) were linked to worsening pain, disability, and overall quality of life. The contrast highlights that short outpatient waiting times, such as those observed in the present study, are unlikely to produce harmful clinical effects compared to prolonged delays in specialized care.

5.1.2 Effect of waiting time on pain intensity

The findings showed that pain intensity slightly increased while patients were waiting to receive treatment but significantly decreased after physiotherapy intervention. This indicates that waiting, even for short periods, may temporarily heighten pain perception due to discomfort or psychological anticipation. However, physiotherapy proved highly effective in reducing pain levels once treatment commenced, demonstrating its clinical efficacy. This result is consistent with Braybrooke *et al*. (2007), who found that patients awaiting posterior lumbar spinal surgery in Canada experienced increased pain and reduced quality of life during prolonged waits, underscoring the negative effects of delayed treatment on symptom severity. Similarly, Borys *et al*. (2015), in a randomized trial conducted in Poland, reported that multimodal physiotherapy produced significant pain relief and improved physical function in patients with chronic low back pain. These two studies together reinforce that while waiting may momentarily worsen pain perception, timely physiotherapy interventions effectively reverse such effects and yield substantial symptom improvement.

5.1.3 Effect of waiting time on coping strategies

This study revealed that patients' coping strategies changed after physiotherapy treatment. There was an improvement in adaptive coping strategies such as distraction and reinterpretation of pain, suggesting that physiotherapy helped patients develop more positive ways to manage pain.

However, an increase in catastrophising was also observed, implying that some patients continued to experience negative or exaggerated thoughts about their pain, possibly due to anxiety or fear while waiting for treatment. Cognitive coping showed little change, indicating that problem-focused coping styles may be less affected by short-term interventions.

These findings correspond with the classic behavioral research by Jensen *et al*. (1991), who critically reviewed coping and chronic pain and concluded that structured behavioral and cognitive interventions can enhance adaptive coping while reducing maladaptive patterns such as catastrophising. The improvement in adaptive strategies observed in this study reflects this therapeutic effect. However, Igwesi-Chidobe *et al*. (2024), in a qualitative analysis of coping among chronic low back pain patients in Nigerian and Zambian communities, found that coping responses are shaped by cultural and social contexts. They noted that some culturally accepted coping behaviors, such as prayer or passive rest, may not align with clinical definitions of adaptive coping. This may explain why catastrophising persisted among some of the patients in this study despite overall improvement in adaptive strategies, underscoring the importance of considering cultural beliefs and psychosocial factors when interpreting coping patterns.

5.1.4 Relationship between actual waiting time and clinical outcomes

The study found that actual waiting time had only weak relationships with most clinical outcomes. Longer waiting times were associated with small increases in post-treatment cognitive coping and pain intensity, but these relationships were not strong enough to suggest a major clinical effect. This implies that short outpatient waiting times, as observed in this study, have limited impact on physiotherapy outcomes, although they may influence patient perceptions or psychological readiness. This finding supports the results of Zhang *et al*. (2023), who demonstrated that actual waiting time does not directly predict patient satisfaction but that subjective waiting experiences do. In other words, patients' emotional and cognitive responses to waiting are more influential than the actual duration of the wait. Similarly, Braybrooke *et al*. (2007) observed that extended waits for spinal surgery correlated with poorer pain and quality-of-life scores, showing that the clinical relevance of waiting time increases substantially as waiting periods lengthen. Together, these studies indicate that while long waits can have detrimental clinical effects, the short outpatient waits documented in the present research have minimal physiological impact but may still shape patient satisfaction and coping.

5.2 Conclusion

This study examined the effect of waiting time on clinical outcomes in patients with NSCLBP attending outpatient physiotherapy at the UBTH. A total of 60 patients with NSCLBP participated in the study. Data were collected using a validated, structured questionnaire designed to capture socio-demographic characteristics, waiting time duration, pain intensity, coping strategies, and patient satisfaction. The instrument was reviewed and approved by the project supervisor and the Physiotherapy Ethical Committee to ensure scientific and ethical rigor. Data were analyzed using frequency counts, percentages, means, standard deviations, and appropriate inferential statistics, while a prospective sampling technique was adopted to ensure that patients were assessed before and after treatment sessions.

The findings revealed that the majority of patients experienced relatively short waiting times, typically less than 30 minutes, before receiving physiotherapy. This suggests that the physiotherapy department at UBTH maintains an efficient outpatient flow system. Despite the short waiting periods, patients reported a slight increase in pain intensity before treatment, which may indicate transient discomfort or psychological anticipation while waiting. However, following physiotherapy intervention, pain intensity significantly decreased, confirming the effectiveness of physiotherapy in pain relief and functional recovery. Waiting time did not appear to significantly affect disability levels, suggesting that short delays may not influence physical function over the short term. Coping strategies, however, were shown to vary before and after treatment. Adaptive strategies such as diversion and reinterpretation of pain improved following therapy, indicating that physiotherapy sessions foster positive coping behaviors. Nonetheless, a modest increase in catastrophizing was observed, implying that some patients may still experience anxiety or negative thoughts while awaiting treatment. Furthermore, correlation analysis revealed that actual waiting time had weak but observable relationships with certain clinical outcomes, such as pain intensity and post-treatment coping patterns. This means that although waiting time may have some influence, the overall clinical improvement seen in patients was largely due to the therapeutic intervention itself rather than the duration of waiting.

Overall, this study concludes that while brief waiting times can temporarily heighten pain perception, they do not significantly worsen disability or long-term clinical outcomes. Physiotherapy interventions remain highly effective in reducing pain and improving coping among patients with NSCLBP. The study further highlights the importance of maintaining efficient service delivery in physiotherapy departments, as reduced waiting times contribute to better patient satisfaction and adherence to treatment. The findings also emphasize the need for patient education and psychological support to manage anxiety and maladaptive coping responses during waiting periods.

In conclusion, timely access to physiotherapy services is vital in achieving optimal outcomes for patients with CLBP. Reducing unnecessary delays, improving communication during waiting periods, and integrating brief coping-enhancement strategies can further enhance the quality of care and overall patient experience at UBTH and similar clinical settings. Future studies are encouraged to include larger samples, extended follow-up periods, and qualitative components to explore patients' perceptions of waiting and satisfaction in greater depth.

5.3 Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed to enhance physiotherapy service delivery and patient outcomes at the UBTH and similar healthcare institutions:

i. **Minimize Waiting Time through Efficient Scheduling:**

   Hospital administrators and physiotherapy units should continue to adopt and improve scheduling systems that reduce patient waiting times. Efficient appointment systems, adequate staffing, and proper time management can help ensure patients are attended to promptly, minimizing discomfort and pre-treatment anxiety.

ii. **Enhance Patient Communication and Engagement during waiting:**

   Even when short waits are unavoidable, patients should be informed about expected waiting durations and reasons for any delay. Providing educational materials, relaxation guidance, or short pre-treatment briefings can help patients manage anxiety and maintain positive expectations while waiting.

iii. **Integrate Brief Coping and Psychological Interventions:**

   Physiotherapists should incorporate brief psychological support or cognitive-behavioral techniques during consultations to address maladaptive coping patterns such as catastrophizing. This can improve patients' mental readiness and enhance the overall effectiveness of physical therapy.

iv. **Continuous Professional Training for Physiotherapists:**

   Regular workshops and professional development programs should be organized to train physiotherapists in communication skills, patient-centered care, and time management strategies. These can help improve patient satisfaction and reduce perceived waiting burdens.

v. **Strengthen Infrastructure and Staffing:**

The physiotherapy department should be adequately equipped with both human and material resources to handle the growing number of patients. Increasing the number of clinicians and treatment cubicles will reduce congestion and prevent unnecessary waiting periods.

vi. **Patient Education and Empowerment:**

Health education programs should be provided to encourage patients to engage in self-management strategies while waiting and between sessions. Educating patients on relaxation techniques, posture correction, and home exercises can improve their ability to cope with pain and reduce dependence on treatment sessions.

vii. **Institutional Policy Development:**

The hospital management should establish and enforce policies that prioritize patient flow and service timeliness in physiotherapy and other outpatient departments. Setting measurable benchmarks for acceptable waiting times can improve efficiency and patient satisfaction across the institution.

5.4 Implications for Further Studies

This study contributes to the understanding of how waiting time influences pain, coping, and satisfaction among patients with chronic low back pain in a Nigerian tertiary hospital setting. However, further research is necessary to expand upon its findings and address identified gaps:

i. **Longitudinal and Multicenter Studies:**

Future research should employ longitudinal designs across multiple healthcare centers to examine the long-term effects of waiting time on pain intensity, functional disability, and treatment adherence. This would provide a broader and more generalizable understanding of the phenomenon.

ii. **Qualitative Exploration of Patient Experiences:**

There is a need for qualitative studies that explore patients' emotional and psychological experiences while waiting for treatment. Such studies can provide in-depth insights into how perceptions, anxiety, and expectations influence satisfaction and clinical outcomes.

iii. **Inclusion of Additional Clinical Variables:**

Future investigations could include other relevant variables such as depression, sleep quality, and physical activity level, which may mediate the relationship between waiting time and clinical outcomes in chronic pain populations.

iv. **Comparative Studies Between Departments:**

Comparative research between different hospital departments (e.g., physiotherapy, orthopedic, or medical outpatient clinics) could reveal how organizational factors influence waiting time and patient satisfaction differently across healthcare disciplines.

v. **Intervention-Based Studies on Waiting Time Management:**

Experimental studies could test the effectiveness of specific interventions such as patient education programs, relaxation techniques, or improved queue management systems on reducing the negative impact of waiting time on pain perception and coping strategies.

vi. **Use of Technology to Manage Patient Flow:**

Future research can also examine the role of digital health innovations, such as automated booking systems and mobile notifications, in minimizing waiting times and enhancing patient experience in physiotherapy services.

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APPENDICES

APPENDIX I: Ethical Approval

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

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DIRECTOR OF ADMINISTRATION
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CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/119

PROPOSAL TITLE: "SHORT-TERM EFFECT OF WAITING TIME ON CLINICAL OUTCOME IN PATIENT WITH NON-SPECIFIC LOW BACK PAIN"

PRINCIPAL INVESTIGATOR(S): IGBOBIE OKWUCHUKWU EMMANUEL

DEPARTMENT/INSTITUTION: DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: JULY 14TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 14/7/2025 TO 13/7/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE** 14/7/2025

SUPERVISOR (S): DR. NICHOLAS OGHUMU

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date 11/08/2025

ubthresearchethics@gmail.com   Registration Number: NHREC/24/01/202

APPENDIX II: Informed Consent Form

Title of study: Short-term effect of waiting time on clinical outcome in patient with Non-specific chronic low back pain

Investigator: Igbobie Okwuchukwu Emmanuel

Supervisors: Dr. Saturday Nicholas Oghumu

Financial Sponsorship: This research project is self-sponsored

Purpose of the research: The purpose of the research is to investigate the effect of waiting time on clinical outcomes (pain intensity, level of disability, catastrophising, diverting attention, cognitive coping and pain reinterpretation) in patients with NSCLBP attending outpatient physiotherapy at the University of Benin Teaching Hospital.

Procedures and protocol involved in the study

You are politely approached to respond to an interviewer-administered questionnaire interview.

This questionnaire would be only used for research purpose and will determine the effect of waiting time on clinical outcomes (pain intensity, level of disability, catastrophising, diverting attention, cognitive coping and pain reinterpretation) in patients with NSCLBP attending outpatient physiotherapy at the University of Benin Teaching Hospital (UBTH).

Compensation

There will be no financial compensation for participating in this study.

Voluntary Participation

Please note that your participation in this research is entirely voluntary. No form of discrimination will be meted to you, should you decide not to participate in this study; You are entirely free to change your mind and stop participating even if you agreed earlier.

Side Effects

There is no anticipated adverse effect associated with participating in this study.

Benefits

Nurses will benefit from the study by gaining increased awareness of harmful postural habits while caring for patients and will be encourage nurses to adopt ergonomic practices that may help reduce the risk of musculoskeletal injuries.

Confidentiality

All information and data obtained in the course of this study will be treated confidentially. The names of the participants will not be written on the questionnaire, and all information collected will be encoded in a file in my personal computer and passworded. Thereafter the questionnaires will be shelved and locked in my personal document cabinet.

CONTACT INFORMATION

IGBOBIE OKWUCHUKWU EMMANUEL
PROJECT STUDENT
Email: eigbobie@gmail.com
Ethics and Research Committee
University of Benin Teaching Hospital
Benin City.
Phone Number: 08108475957

CERTIFICATE OF CONSENT

I have read the above information (or it has been read to me). I had the opportunity to ask questions about it and the questions were answered to my satisfaction.

I consent voluntarily to take part as a participant in this study

I do not consent to participate in this study.

Signature of participant: ________________________________

Date:____

APPENDIX III: Sociodemographic and characteristics of participant

Section A: Please tick (✓) the most appropriate option. Your responses will be treated with utmost confidentiality and used for research purposes only.

Age (in years): 30–39 ( ) 40–49 ( ) 50–59 ( ) 60–69 ( ) 70 and above ( )

Sex: Male ( ) Female ( )

Marital Status: Single ( ) Married ( ) Divorced ( ) Widowed ( )

Educational Level: No formal education ( ) Primary education ( ) Secondary education ( ) Tertiary education ( )

Employment Status: Unemployed ( ) Employed (Public sector) ( ) Employed (Private sector) ( ) Self-employed ( ) Student ( ) Retired ( )

Duration of Chronic Low Back Pain (CLBP): 3–6 months ( ) 7–12 months ( ) 1–2 years ( ) More than 2 years ( )

Have you received any treatment for your low back pain prior to now? Yes ( ) No ( )

If Yes, specify type:

( ) Physiotherapy

( ) Medications

( ) Traditional medicine

( ) Others: ________________________

Number of Clinical Visits for Back Pain in the Last 6 Months: Once 2–3 times 4–5 times More than 5 times

Average Waiting Time Before Seeing a Clinician During Each Visit: Less than 30 minutes ( ) 30 minutes – 1 hour ( ) 1–2 hours ( ) More than 2 hours

Body Mass Index (BMI):

(You may skip if unsure; the researcher will calculate)

Height (in meters): ___________

Weight (in kilograms): ___________

(BMI = weight in kg / height^2 in m^2)

Rate Your Pain Intensity on a Scale of 0 to 10:

(0 = No pain, 10 = Worst imaginable pain)

( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( ) 6 ( ) 7 ( ) 8 ( ) 9 ( ) 10

Smoking Status: Non-smoker ( ) Former smoker ( ) Current smoker

Alcohol Consumption: Never ( ) Occasionally ( ) Frequently

Actual waiting time (minutes): _________________

APPENDIX IV: Visual Analogue Scale

NAME:____________________________________

On Arrival to the clinic

Immediately before treatment begins

After treatment

APPENDIX V: Satisfaction level scale for waiting time in Non-Specific Chronic Low Back Pain Patients

To evaluate patients' perceived satisfaction with waiting time for outpatient physiotherapy, each patient was asked to assign a score between **0 and 100**, where:

- **0** = *Extremely dissatisfied*
- **100** = *Completely satisfied*

Score Range	Satisfaction Level	Description	Tick the appropriate Box
0–19	Very Dissatisfied	Patient strongly believes the waiting time negatively affected care.	
20–39	Dissatisfied	Patient is unhappy and considers the wait to be excessive or inappropriate.	
40–59	Neutral / Fair	Patient is neither satisfied nor dissatisfied — wait time was tolerable.	
60–79	Satisfied	Patient had a generally acceptable wait and is content with the service flow.	
80–100	Very Satisfied	Patient experienced minimal wait and found the process efficient and timely.	

APPENDIX VI: Coping strategy Questionnaire 24

The aim of this questionnaire is to assess your cognitive and behavioural strategies in copying with pain. **Please tick the appropriate choice for each item as indicated by your pain.**

	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always
Catastrophising							
I feel I cannot stand anymore							
I feel like I cannot go on							
It is awful and I feel that it overwhelms me							
It is terrible and I feel it is never going to get any better							
I worry all the time about whether it will end							
I feel my life is not worth living							

Diverting Attention							
I don't do something I enjoy, such as watching TV or listening to music							
I leave the house and do something, such as going to the movies or shopping							
I count numbers in my head or run a song through my mind							
I play mental games with myself to keep my mind off the pain							
I walk a lot							
I try to be around other people							
Reinterpretation							
I tell myself I cannot let the pain stand in the way of what I have to do							

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I see it as a challenge and don't let it bother me							
No matter how bad it gets, I know I can handle it							
Although it's painful, I just keep on going							
I just go on as if nothing happened							
Cognitive							
I imagine that the pain is outside of my body							
I try not to think of it as my body, but rather as something separate from me.							
I pretend it is not a part of me							
I try to feel distant from the pain, almost as if the pain was in somebody else's body							
I pretend it is not there.							
I tell myself it doesn't hurt.							