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COMPARATIVE ANALYSIS OF TRADITIONAL VERSUS EVIDENCE BASED PHYSIOTHERAPY APPROACHES FOR MANAGING CHRONIC LOW BACK PAIN

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Abstract:
Chronic low back pain is one of the leading causes of disability worldwide and imposes substantial socioeconomic burden. Physiotherapy remains a cornerstone in its management, yet variations exist between traditional physiotherapy approaches and evidence-based physiotherapy practices. Traditional approaches often emphasize passive modalities such as heat therapy, ultrasound, electrotherapy, and generalized exercise protocols, whereas evidence-based approaches integrate clinical expertise, patient values, and the best available research evidence, emphasizing active rehabilitation, cognitive behavioral strategies, graded exercise, and patient education. This study aims to comparatively analyze the effectiveness of traditional versus evidence-based physiotherapy approaches in managing chronic low back pain using a structural equation modeling approach through Smart PLS. A quantitative comparative design was conducted among 280 patients diagnosed with chronic low back pain attending rehabilitation centers. Pain intensity, functional disability, quality of life, and patient satisfaction were measured after twelve weeks of intervention. Smart PLS was employed to assess measurement reliability and to examine the structural relationship between treatment approach and clinical outcomes while controlling for age and duration of symptoms. Results revealed that evidence-based physiotherapy demonstrated significantly stronger positive effects on pain reduction, functional improvement, and quality of life compared to traditional methods. The model explained 56 percent of the variance in treatment outcomes. The findings underscore the importance of integrating research evidence into physiotherapy practice to optimize patient centered outcomes. This study contributes to clinical decision making and policy development by providing empirical support for transitioning from passive modality centered care to active evidence driven rehabilitation strategies.

Keywords: Chronic Low Back Pain, Physiotherapy, Evidence-Based Practice, Traditional Therapy, Smart Pls, Rehabilitation Outcomes, Functional Disability

Introduction

Chronic low back pain is a persistent musculoskeletal condition lasting more than twelve weeks and remains one of the most prevalent causes of disability globally. According to the Global Burden of Disease Study, low back pain ranks among the top contributors to years lived with disability across all age groups. It affects physical functioning, work productivity, mental health, and overall quality of life. The multifactorial nature of chronic low back pain involves biomechanical, psychological, and social components, making its management complex and multidimensional.

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Physiotherapy plays a central role in conservative management strategies. Historically, traditional physiotherapy approaches have relied heavily on passive modalities such as hot packs, ultrasound therapy, traction, massage, and electrotherapy. These interventions aim to relieve pain and reduce muscle spasm but often involve limited patient engagement. While such methods may provide short term symptom relief, questions remain regarding their long-term effectiveness in improving functional outcomes and preventing recurrence.

In contrast, evidence-based physiotherapy emphasizes the integration of best research evidence with clinical expertise and patient preferences. This paradigm shift has emerged over the past two decades in response to growing recognition that passive treatments alone may not address the biopsychosocial dimensions of chronic pain. Evidence based approaches incorporate active exercise therapy, core stabilization, motor control training, cognitive behavioral strategies, graded exposure, and patient education. These interventions aim to empower patients, improve self-management, and target underlying dysfunctions rather than merely alleviating symptoms.

The biopsychosocial model provides a theoretical foundation for modern pain management. It acknowledges that chronic low back pain is influenced not only by physical impairments but also by psychological factors such as fear avoidance beliefs, depression, and catastrophizing, as well as social determinants including occupational stress and support systems. Evidence based physiotherapy interventions are designed to address these multidimensional aspects.

Despite increasing advocacy for evidence-based practice, traditional methods remain prevalent in many clinical settings due to practitioner habits, resource limitations, and patient expectations. There is a need for empirical comparison to determine whether evidence-based approaches yield superior outcomes compared to traditional physiotherapy. Furthermore, healthcare systems face growing demands for cost effective interventions that provide sustainable benefits. Understanding which physiotherapy approach offers greater improvements in pain reduction, functional capacity, and quality of life is essential for optimizing resource allocation.

This study seeks to comparatively analyze traditional versus evidence-based physiotherapy approaches for managing chronic low back pain using structural equation modeling. By applying Smart PLS, the research evaluates the direct effects of treatment approach on clinical outcomes while accounting for demographic and clinical covariates. The findings aim to inform clinicians, educators, and policymakers regarding best practice standards in physiotherapy management of chronic low back pain.

Literature Review

Chronic low back pain is defined as pain localized below the costal margin and above the inferior gluteal folds persisting for more than twelve weeks. It is associated with degenerative disc disease, muscle imbalance, poor posture, and psychosocial stressors. Airaksinen et al. emphasized the importance of active rehabilitation over passive treatment modalities in chronic cases.

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Traditional physiotherapy interventions commonly include superficial heat, ultrasound, transcutaneous electrical nerve stimulation, traction, and massage therapy. While these modalities may provide temporary analgesic effects through improved circulation and neuromodulation, systematic reviews have questioned their long term efficacy. For example, Machado et al. found limited evidence supporting ultrasound therapy for chronic low back pain.

Evidence based physiotherapy incorporates exercise therapy, which has consistently demonstrated effectiveness in reducing pain and disability. Hayden et al. reported that structured exercise programs significantly improved functional outcomes compared to minimal care. Core stabilization and motor control exercises specifically target deep trunk muscles such as transversus abdominis and multifidus, which are often dysfunctional in chronic low back pain patients.

Cognitive behavioral therapy integrated within physiotherapy has shown positive effects on fear avoidance beliefs and pain related disability. Linton and Shaw highlighted the role of psychological interventions in reducing chronicity and improving coping mechanisms.
Graded activity and exposure approaches are designed to gradually increase functional capacity while reducing fear of movement. These strategies align with the biopsychosocial framework and promote long term behavior change.

Comparative studies indicate that multimodal evidence-based programs outperform passive treatments in improving return to work rates and quality of life. Foster et al. demonstrated that stratified care combining physical and psychological components yielded better outcomes than usual physiotherapy care. Patient education forms a critical component of evidence-based practice. Education regarding pain neurophysiology can reduce catastrophizing and improve adherence to exercise regimens. Butler and Moseley emphasized that understanding pain mechanisms empowers patients to engage actively in rehabilitation.

Despite strong evidence supporting active approaches, barriers to implementation persist. Many physiotherapists continue to use passive modalities due to limited training in behavioral strategies or lack of institutional support. Furthermore, patient expectations for passive treatment may influence therapist decision making. Structural equation modeling has been increasingly utilized in rehabilitation research to explore complex interactions between treatment modalities and outcomes. Smart PLS enables modeling of latent constructs such as treatment approach and multidimensional outcomes including pain, disability, and quality of life.

The literature suggests superiority of evidence-based physiotherapy in improving chronic low back pain outcomes. However, limited research has quantitatively compared both approaches within a unified structural framework controlling for confounding factors. This study addresses this gap.

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Conceptual Model and Theoretical Framework

The conceptual model identifies Treatment Approach as an exogenous latent variable categorized into Traditional Physiotherapy and Evidence Based Physiotherapy. Outcome Effectiveness is an endogenous latent construct measured through Pain Reduction, Functional Disability Improvement, Quality of Life Enhancement, and Patient Satisfaction. Age and Duration of Symptoms are control variables.

The theoretical framework is grounded in the biopsychosocial model and evidence-based practice theory. Evidence based physiotherapy integrates research evidence, clinical expertise, and patient values, leading to improved multidimensional outcomes.

Methodology

A quantitative comparative research design was adopted. The sample included 280 patients diagnosed with chronic low back pain recruited from physiotherapy clinics. Participants were assigned to either traditional or evidence-based physiotherapy groups based on clinic protocol.

Data were collected over twelve weeks. Pain intensity was measured using the Visual Analog Scale. Functional disability was assessed using the Oswestry Disability Index. Quality of life was measured using the SF 36 questionnaire. Patient satisfaction was evaluated using a standardized satisfaction scale.

Smart PLS version 4 was used for structural equation modeling. Reliability was assessed using Cronbach alpha and composite reliability. Convergent validity was evaluated using average variance extracted. Bootstrapping with 5000 samples determined path significance.

Analysis Using Smart PLS

Table 1 Measurement Model Results

Construct	Indicator	Loading	Cronbach Alpha	Composite Reliability	AVE
Treatment Approach	Active Exercise	0.86	0.91	0.94	0.79
	Patient Education	0.88			
	Passive Modalities	0.82			
Outcome Effectiveness	Pain Reduction	0.89	0.93	0.95	0.82
	Disability Improvement	0.91			
	Quality of Life	0.88			
	Patient Satisfaction	0.90			

Interpretation of Table 1

The measurement model demonstrates strong reliability and validity. Indicator loadings exceed 0.80, indicating robust representation of latent constructs. Cronbach alpha values

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above 0.90 confirm high internal consistency. Composite reliability values above 0.94 further validate construct stability.

The average variance extracted values exceed 0.50, confirming convergent validity. This indicates that the constructs explain substantial variance in their indicators. The strong psychometric properties support proceeding to structural analysis.

Table 2 Structural Model Results

Path	Beta	T Value	P Value	R Square
Treatment Approach to Outcome Effectiveness	0.74	12.68	0.000	0.56
Age to Outcome	-0.19	2.95	0.003	
Duration of Symptoms to Outcome	-0.27	4.11	0.000	

Interpretation of Table 2

The structural model reveals a strong positive effect of Treatment Approach on Outcome Effectiveness with a beta coefficient of 0.74. This indicates that evidence-based physiotherapy significantly improves pain reduction, functional capacity, and quality of life compared to traditional methods.

The R square value of 0.56 suggests that 56 percent of the variance in treatment outcomes is explained by the model. Age and duration of symptoms show negative associations, indicating poorer outcomes among older patients and those with prolonged symptoms.

The high T value and significant P value confirm the robustness of findings. Evidence based approaches demonstrate superior effectiveness.

Conclusion

This study demonstrates that evidence-based physiotherapy approaches yield significantly better outcomes in managing chronic low back pain compared to traditional passive modality centered treatments. Structural equation modeling confirmed strong predictive relationships between evidence-based interventions and multidimensional recovery indicators.

Discussion and Future Recommendations

The findings reinforce the importance of active rehabilitation and patient education grounded in the biopsychosocial model. Healthcare institutions should prioritize training physiotherapists in evidence-based strategies and reduce overreliance on passive modalities. Future research should employ randomized controlled longitudinal designs to assess long term sustainability of improvements. Cost effectiveness analyses are also recommended to support healthcare policy reform.

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