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EFFECTIVENESS OF DIRECT ACCESS PHYSIOTHERAPY IN MUSCULOSKELETAL CARE: A RANDOMIZED CONTROLLED TRIAL ASSESSING CLINICAL OUTCOMES, HEALTHCARE UTILIZATION, AND PRIMARY CARE WORKLOAD

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Abstract

Background

Musculoskeletal disorders (MSDs) are among the leading causes of disability worldwide and contribute substantially to healthcare utilization and primary care workload. Conventional physician-led referral pathways may delay access to rehabilitation services and increase healthcare resource consumption. Direct access physiotherapy has emerged as an alternative model of care; however, evidence from low- and middle-income countries remains limited.

Objective

To evaluate the effectiveness of direct access physiotherapy in musculoskeletal care by assessing clinical outcomes, healthcare utilization, and primary care workload among patients attending a tertiary care teaching hospital.

Methods

A parallel-group randomized controlled trial was conducted at Mufti Mehmood Memorial Teaching Hospital MTI Dera Ismail Khan Khyber Pakhtunkhwa, Pakistan. A total of 160 participants with musculoskeletal disorders were randomly assigned to either the Direct Access Physiotherapy (DAP) group (n = 80) or the Conventional Referral Care (CRC) group (n = 80). Participants in the DAP group received supervised physiotherapy twice weekly for 12 weeks, whereas participants in the CRC group followed the routine physician-led referral pathway. Primary outcomes included the Numeric Pain Rating Scale (NPRS), Patient-Specific Functional Scale (PSFS), Pain Disability Index (PDI), EuroQol Five-Dimension Five-Level Questionnaire (EQ-5D-5L), and Patient Satisfaction Questionnaire Short Form (PSQ-18). Secondary outcomes included healthcare utilization and primary care workload indicators. Assessments were conducted at baseline, Week 6, and Week 12. Data was analyzed using mixed repeated-measures analysis, with statistical significance established at $p < 0.05$.

Results

Of the 160 randomized participants, 150 completed the 12-week follow-up and were included in the final analysis. Significant group × time interactions were observed for all primary outcomes ($p < 0.05$). Participants receiving direct access physiotherapy demonstrated greater reductions in NPRS scores (2.8 ± 1.3 vs 4.1 ± 1.8; $p < 0.001$) and PDI scores (21.4 ± 8.6 vs 29.7 ± 9.4; $p < 0.001$), alongside superior improvements in PSFS (78.6 ± 11.2 vs 68.1 ± 12.9; $p < 0.001$), EQ-5D-5L (0.82 ± 0.09 vs 0.73 ± 0.11; $p = 0.002$), and PSQ-18 scores (8.7 ± 1.2 vs 7.4 ± 1.5; $p = 0.001$) at Week 12. The DAP group also demonstrated lower healthcare utilization, including physician consultations (1.3 ± 0.7 vs 3.1 ± 1.1; $p < 0.001$), imaging requests (22.5% vs 46.2%; $p = 0.003$), medication prescriptions (32.5% vs 61.2%; $p < 0.001$), and specialist referrals (8.8% vs 20.0%; $p = 0.041$). Primary care workload indicators, including consultation duration (9.4 ± 2.3 minutes vs 14.8 ± 3.1 minutes; $p <$

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0.001) and follow-up consultations (1.1 ± 0.6 vs 2.4 ± 1.0; p < 0.001), were significantly reduced in the DAP group.

Conclusion

Direct access physiotherapy was associated with improved clinical outcomes, reduced healthcare utilization, and decreased primary care workload among patients with musculoskeletal disorders. These findings suggest that direct access physiotherapy may represent an effective and sustainable model of musculoskeletal care within tertiary healthcare settings in Pakistan.

INTRODUCTION

Musculoskeletal disorders (MSDs) constitute one of the leading causes of disability, functional limitation, and healthcare utilization worldwide. They contribute substantially to years lived with disability, diminished quality of life, reduced work productivity, and increased economic burden on healthcare systems(1-3). In primary healthcare settings, musculoskeletal complaints represent a considerable proportion of patient consultations, thereby increasing the workload of physicians and prolonging waiting times for specialized rehabilitation services (3-5).

Conventional management pathways for musculoskeletal disorders in many healthcare systems, including Pakistan, are largely physician centered. Patients are commonly required to consult a primary care physician before obtaining access to physiotherapy services. This referral-dependent approach may result in delays in assessment, initiation of treatment, increased healthcare expenditures, repeated consultations, unnecessary diagnostic investigations, and excessive utilization of pharmacological interventions (6, 7).

Direct access physiotherapy has emerged as an alternative healthcare delivery model designed to improve the efficiency of musculoskeletal care. Direct access permits patients to seek consultation, assessment, diagnosis within the physiotherapy scope of practice, and management from physiotherapists without requiring prior referral from a medical practitioner. This model has gained increasing attention in several healthcare systems because of its potential to reduce barriers to rehabilitation services, facilitate earlier intervention, optimize healthcare resources, and decrease the burden on primary healthcare providers (8).

Recent evidence suggests that direct access physiotherapy can provide clinical outcomes comparable to traditional physician-led referral pathways while simultaneously improving healthcare efficiency. A systematic review conducted by Gallotti et al. reported that direct access physiotherapy was associated with improved disability outcomes, enhanced quality of life, reduced healthcare costs, and greater patient satisfaction among individuals with musculoskeletal disorders. The review further emphasized that physiotherapists practicing within direct access pathways demonstrated acceptable levels of diagnostic accuracy and patient safety (9).

Similarly, Babatunde and colleagues synthesized evidence regarding self-referral and non-medical triage pathways for musculoskeletal pain and concluded that direct access services were associated with reduced healthcare utilization, fewer imaging requests, shorter waiting times, and efficient allocation of healthcare resources (10). These findings indicate that direct access models may

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contribute substantially to healthcare system sustainability, particularly in settings facing increasing patient volumes and shortages of primary care providers.

An updated scoping review published in 2024 demonstrated that direct access physiotherapy provides at least equivalent quality of care compared with conventional physician-led pathways. Patients receiving direct access physiotherapy experienced lower waiting times, decreased medication use, reduced medical imaging requests, and improved opportunities for timely rehabilitation. Furthermore, providers reported improved decision-making processes and greater treatment adherence among patients managed through direct access pathways (11).

Emerging evidence also suggests that direct access physiotherapy has favorable implications for healthcare utilization patterns. Fischer et al. reported that direct access pathways were associated with reduced general practitioner workload, decreased resource consumption, and maintenance of comparable clinical outcomes when contrasted with referral-based care models. Their systematic review indicated that patients receiving direct access physiotherapy required fewer physician consultations, reduced imaging investigations, and demonstrated similar recovery trajectories without increased risk of adverse events (12).

In a longitudinal evaluation of direct access physiotherapy implementation, Zouch et al. observed an approximate 10% reduction in musculoskeletal-related general practitioner consultations following introduction of direct access services. The study demonstrated that this model of care could alleviate pressure on primary healthcare systems without increasing specialist consultations or surgical interventions (13). Such findings are particularly important in countries with limited healthcare resources where optimizing service delivery remains a priority.

Healthcare systems worldwide continue to experience substantial challenges associated with increasing musculoskeletal disease burden(1-3). Delays in accessing rehabilitation services often contribute to persistent pain, chronic disability, work absenteeism, and increased dependence on medications. Timely physiotherapy interventions have been shown to improve functional recovery, promote self-management, and reduce long-term healthcare expenditures (14).

Several countries have incorporated direct access physiotherapy into primary healthcare frameworks, acknowledging physiotherapists as autonomous practitioners with competencies in screening, clinical decision-making, differential diagnosis, and management of musculoskeletal conditions. Contemporary consensus statements have identified the knowledge, skills, and competencies necessary for physiotherapists to practice safely within direct access environments, thereby supporting expansion of autonomous physiotherapy services internationally (15).

Despite growing international evidence supporting direct access physiotherapy, implementation within low- and middle-income countries remains limited. In Pakistan, musculoskeletal disorders constitute a major public health concern, yet access to rehabilitation services is predominantly dependent upon physician referrals. Consequently, healthcare facilities experience increased patient loads, prolonged waiting periods, repeated consultations, and inefficient utilization of primary healthcare resources. Evidence evaluating direct access physiotherapy within the Pakistani healthcare context remains scarce.

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Furthermore, there is a paucity of randomized controlled trials examining the influence of direct access physiotherapy on clinical outcomes, healthcare utilization patterns, and physician workload in South Asian healthcare systems. Most available studies have originated from Europe, North America, and high-income countries, limiting the generalizability of findings to developing healthcare settings (11-13).

Given the increasing burden of musculoskeletal disorders and the need for innovative healthcare delivery strategies, evaluating direct access physiotherapy within the Pakistani context is essential. Understanding its impact on patient outcomes, healthcare resource consumption, and primary care workload may inform evidence-based policy decisions and facilitate integration of physiotherapy-led models of care into routine clinical practice. Therefore, the present randomized controlled trial was undertaken to assess the effectiveness of direct access physiotherapy in musculoskeletal care by evaluating clinical outcomes, healthcare utilization, and primary care workload among patients attending Khyber Medical Teaching Institution Hospital, Peshawar.

Methodology

Study Design

A parallel-group randomized controlled trial was conducted to evaluate the effectiveness of direct access physiotherapy in the management of musculoskeletal disorders. The study compared direct access physiotherapy with the conventional physician-led referral pathway with respect to clinical outcomes, healthcare utilization, and primary care workload.

Study Setting

The study was conducted at the Physiotherapy Department and Primary Care Services of Mufti Mehmood Memorial Teaching Hospital MTI Dera Ismail Khan Khyber Pakhtunkhwa, Pakistan. Participants presenting with musculoskeletal disorders were recruited from outpatient clinics and screened for eligibility according to predefined inclusion and exclusion criteria. The study was undertaken in a tertiary care teaching hospital that provides multidisciplinary healthcare services and manages a substantial caseload of patients with musculoskeletal conditions.

Study Population

The study population comprised of adult patients presenting with musculoskeletal disorders seeking healthcare services at of Mufti Mehmood Memorial Teaching Hospital MTI Dera Ismail Khan Khyber Pakhtunkhwa, Pakistan

Inclusion Criteria

Participants were included if they:

- Were aged 18 years or above;
- Presented with musculoskeletal pain, dysfunction, or disability requiring conservative management;
- Were able to understand and comply with study procedures; and

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- Provided written informed consent for participation.

Exclusion Criteria

Participants were excluded if they:

- Had red flag conditions requiring immediate medical or surgical intervention;
- Had recent fractures, surgery, or trauma necessitating specialized management;
- Had neurological disorders significantly affecting musculoskeletal function;
- Had systemic inflammatory or malignant conditions; or
- Had contraindications to physiotherapy interventions.

Sample Size Determination

The sample size was estimated by using G Power software (Version 3.1). Assuming a moderate effect size (Cohen's d = 0.50), a statistical power of 80%, and a two-sided significance level of 5%, the minimum required sample size was calculated to be 128 participants. To compensate for potential dropouts and losses to follow up, an additional 20% was incorporated into the estimated sample size. Consequently, a total of 160 participants were enrolled in the study and randomly allocated in a 1:1 ratio, with 80 participants assigned to the Direct Access Physiotherapy group and 80 participants assigned to the Conventional Referral Care group.

Randomization and Allocation

Eligible participants were randomly assigned to either the Direct Access Physiotherapy group or the Conventional Referral Care group using a computer-generated randomization sequence. Allocation concealment was maintained through sequentially numbered, sealed, opaque envelopes prepared by an independent researcher who was not involved in participant recruitment or outcome assessment.

Intervention Procedures

Direct Access Physiotherapy Group

Participants allocated to the Direct Access Physiotherapy (DAP) group received an initial assessment directly from a licensed physiotherapist without prior consultation with a primary care physician. The assessment included detailed history taking, physical examination, clinical evaluation, identification of musculoskeletal impairments, and formulation of an individualized treatment plan. Participants allocated to the Direct Access Physiotherapy (DAP) group received supervised physiotherapy sessions twice weekly for a period of 12 weeks, resulting in a total of 24 treatment sessions. Each session lasted approximately 45–60 minutes and was individualized according to the participant's clinical presentation, impairments, and functional limitations. The intervention program comprised therapeutic exercises designed to improve flexibility, muscular strength, endurance, and functional capacity, along with manual therapy techniques, including joint mobilization and soft tissue interventions, when clinically indicated.

Participants also received education regarding pain mechanisms, posture, ergonomics, activity modification, and self-management strategies to facilitate symptom management and functional

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recovery. Ergonomic counseling was provided to minimize exposure to aggravating factors and promote healthy movement behaviors during daily activities. In addition, participants were prescribed a structured home exercise program to be performed three to five days per week, with exercise progression adjusted according to individual tolerance and clinical improvement. Treatment adherence was monitored throughout the intervention period, and exercise progression was individualized based on patient response and therapeutic goals.

Table 1. Direct Access Physiotherapy (DAP) Intervention Protocol

Intervention Component	Description	Frequency	Duration	Delivery Method
Initial Assessment	Comprehensive physiotherapy assessment including history taking, physical examination, movement analysis, identification of impairments, screening for red flags, and individualized goal setting	Once	45–60 minutes	Face-to-face
Therapeutic Exercise	Flexibility, strengthening, endurance, stabilization, balance, and functional retraining exercises tailored to individual needs	2 sessions/week	12 weeks	Supervised
Manual Therapy	Joint mobilization, soft tissue mobilization, stretching techniques, and manual interventions when clinically indicated	As required	During treatment sessions	Supervised
Pain Education	Education regarding pain mechanisms, prognosis, activity modification, and self-management strategies	At baseline and reinforced during follow-up	Throughout study period	Face-to-face
Ergonomic	Advice regarding posture	Weekly	12 weeks	Individual

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Counseling	correction, workplace ergonomics, lifting mechanics, and daily activity modification	reinforcement		counseling
Home Exercise Program	Individual prescribed exercises designed to maintain gains achieved during supervised sessions	3–5 days/week	12 weeks	Home-based
Exercise Progression	Gradual progression of exercise intensity, repetitions, resistance, and functional demands according to patient tolerance	Every 2–3 weeks	12 weeks	Physiotherapist-guided
Adherence Monitoring	Monitoring of attendance, home exercise compliance, and treatment participation	Every visit	12 weeks	Treatment logbook
Follow-up Assessments	Evaluation of clinical outcomes including NPRS, PSFS, PDI, EQ-5D-5L, and PSQ-18	Baseline, Week 6, Week 12	–	Standardized assessment

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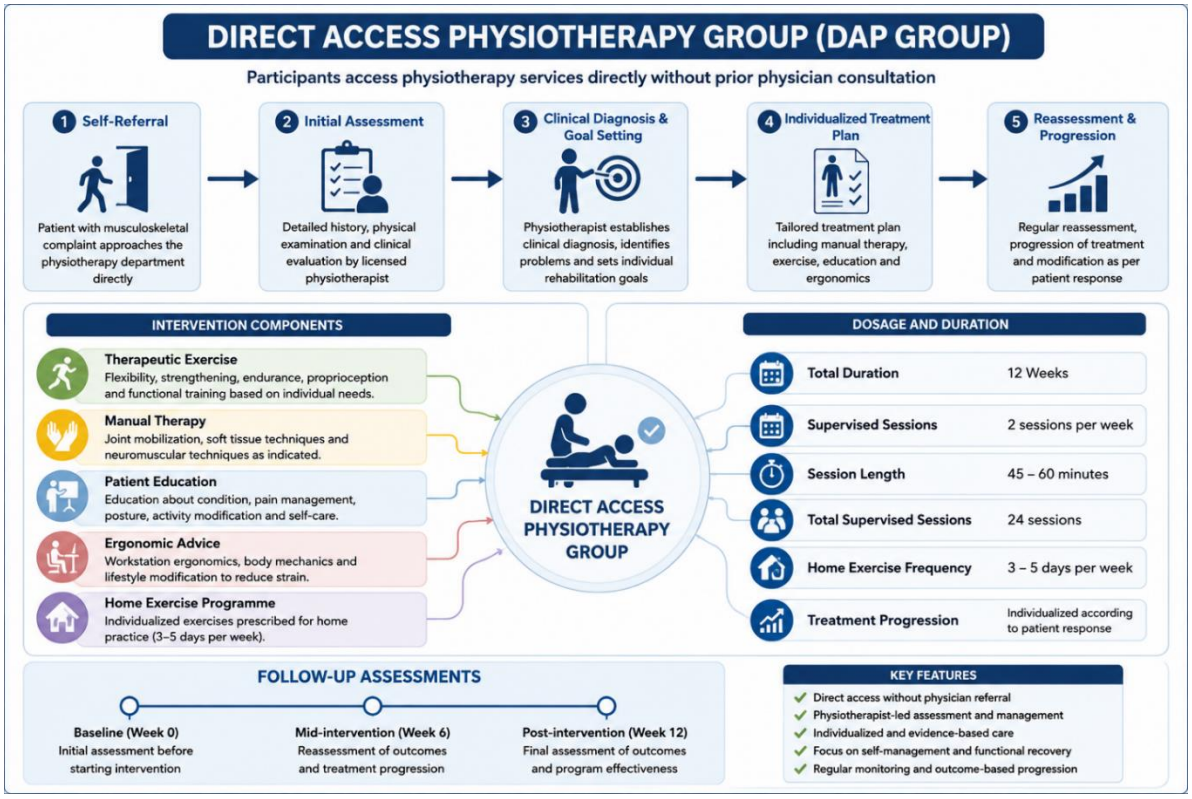

Conventional Referral Care Group

Participants allocated to the Conventional Referral Care (CRC) group followed the routine healthcare pathway practiced within the institution. Patients were initially evaluated by a primary care physician and referred to physiotherapy services when considered necessary.

Participants in this group received standard medical management according to institutional protocols, which could include pharmacological treatment, diagnostic investigations, specialist referrals, and physiotherapy services following physician referral. Physiotherapy interventions, when prescribed, were delivered according to standard departmental practices.

Table 2. Conventional Referral Care (CRC) Pathway Protocol

Intervention Component	Description	Frequency	Duration	Delivery Method
Initial Medical Consultation	Participants were initially evaluated by a primary care physician for assessment of musculoskeletal complaints, medical history, and physical examination	Once	15–20 minutes	Face-to-face

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Diagnostic Evaluation	Diagnostic imaging and laboratory investigations were prescribed when deemed clinically necessary by the physician	As indicated	Variable	Physician-directed
Pharmacological Management	Prescription of analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, or other medications according to institutional protocols	As required	Variable	Physician-directed
Specialist Referral	Referral to orthopedic, rheumatology, pain management, or other specialty services when clinically indicated	As required	Variable	Physician-directed
Physiotherapy Referral	Referral to physiotherapy services was initiated at the discretion of the treating physician based on clinical judgment	As indicated	Variable	Physician-directed
Physiotherapy Intervention	Participants who received physiotherapy underwent treatment according to routine departmental practices without a standardized intervention protocol	Variable	Variable	Supervised
Follow-up Consultations	Participants attended physician follow-up visits according to symptom progression, treatment response, and physician recommendations	As required	Throughout study period	Face-to-face
Healthcare Utilization Monitoring	Number of physician consultations, imaging requests, medication prescriptions, specialist	Throughout study period	12 weeks	Medical records review

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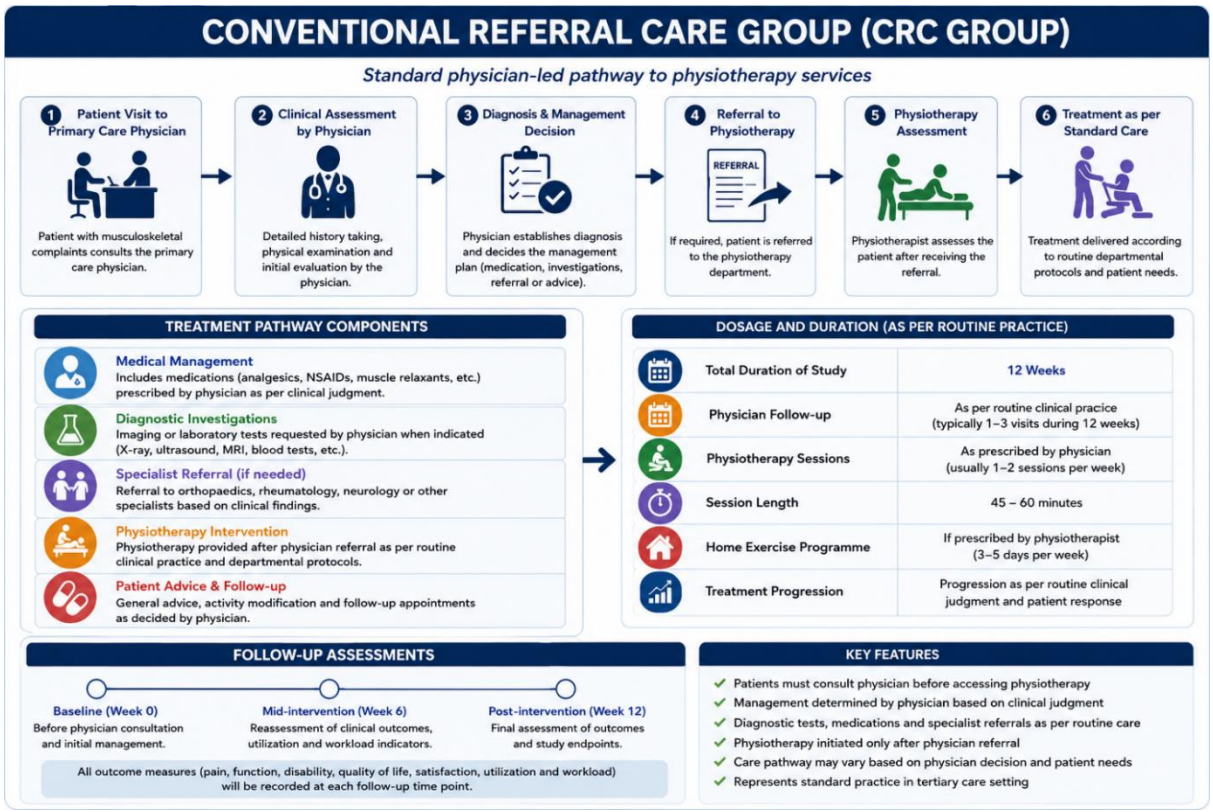
	referrals, and emergency visits were documented			
Follow-up Assessments	Clinical outcomes including NPRS, PSFS, PDI, EQ-5D-5L, and PSQ-18 were evaluated at predefined assessment points	Baseline, Week 6, Week 12	–	Standardized assessment



Outcome Measures

Primary Outcomes

Primary outcomes were assessed using validated instruments commonly employed in musculoskeletal research.

Pain Intensity

Pain intensity was measured using the Numeric Pain Rating Scale (NPRS), an 11-point scale ranging from 0 (no pain) to 10 (worst imaginable pain). The NPRS has demonstrated excellent reliability, validity, and responsiveness in patients with musculoskeletal disorders.

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Functional Status

Functional status was assessed using the Patient-Specific Functional Scale (PSFS). Participants identified activities limited by their musculoskeletal condition and rated their ability to perform these activities on an 11-point scale, where higher scores indicated better functional performance.

Disability

Disability was evaluated using the Pain Disability Index (PDI), which assesses the impact of pain on daily functioning across multiple domains including family responsibilities, recreation, social activity, occupation, self-care, and life-support activities.

Health-Related Quality of Life

Health-related quality of life was assessed using the EuroQol Five-Dimension Five-Level Questionnaire (EQ-5D-5L). This instrument evaluates mobility, self-care, usual activities, pain/discomfort, and anxiety/depression and provides an overall measure of health status.

Patient Satisfaction

Patient satisfaction was measured using the Patient Satisfaction Questionnaire Short Form (PSQ-18), which evaluates dimensions such as communication, accessibility, technical competence, and overall satisfaction with healthcare services.

Secondary Outcomes

Secondary outcomes included indicators of healthcare utilization and primary care workload. Healthcare utilization outcomes comprised the number of physician consultations, physiotherapy sessions attended, diagnostic imaging requests, medication prescriptions, specialist referrals, emergency department visits, and additional healthcare encounters occurring during the study period. Primary care workload indicators included consultation frequency, consultation duration, referral rates to physiotherapy services, and the overall burden of musculoskeletal cases managed within primary care settings.

Follow-up Assessments

Outcome assessments were conducted at three predefined time points: baseline (Week 0), mid-intervention (Week 6), and post-intervention follow-up (Week 12). Baseline assessments were completed before randomization. Follow-up evaluations at Weeks 6 and 12 were performed to assess short-term and medium-term changes in clinical outcomes, healthcare utilization, and primary care workload.

Pain intensity, functional status, disability, health-related quality of life, and patient satisfaction were assessed at each assessment point. Healthcare utilization indicators and primary care workload measures were documented throughout the 12-week study period.

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Data Collection Procedures

Baseline demographic and clinical characteristics were collected before randomization. Participants underwent follow-up assessments during Week 6 and Week 12 after initiation of treatment. Clinical outcomes, healthcare utilization indicators, and primary care workload measures were recorded using standardized assessment forms at each assessment point to ensure consistency, completeness, and data quality.

Blinding

Due to the nature of the intervention, blinding of participants and treating physiotherapists was not feasible. However, outcome assessors and data analysts were blinded to treatment allocation whenever possible to minimize assessment and analytical bias.

Statistical Analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 27.0. Descriptive statistics were used to summarize participant characteristics. Continuous variables were presented as mean ± standard deviation or median with interquartile range depending on data distribution, whereas categorical variables were reported as frequencies and percentages.

Between-group comparisons were performed using independent sample t-tests or Mann–Whitney U tests for continuous variables and chi-square tests for categorical variables. Changes in outcome measures across Baseline, Week 6, and Week 12 were analyzed using mixed repeated-measures analysis of variance (ANOVA), with treatment group (DAP vs CRC) as the between-subject factor and assessment time as the within-subject factor. Significant interaction effects were further explored using Bonferroni-adjusted post hoc comparisons. Statistical significance was established at $p < 0.05$.

Results

Participant Flow

A total of 196 patients with musculoskeletal disorders were assessed for eligibility between January 2025 and December 2025. Thirty-six patients were excluded because they did not meet the inclusion criteria or declined participation. Subsequently, 160 participants were randomized equally into two groups. Eighty participants were allocated to the Direct Access Physiotherapy (DAP) group and 80 participants to the Conventional Referral Care (CRC) group.

During follow-up, four participants in the DAP group and six participants in the CRC group were lost to follow-up. Consequently, 76 participants in the DAP group and 74 participants in the CRC group completed the 12-week intervention period and were included in the final analysis.

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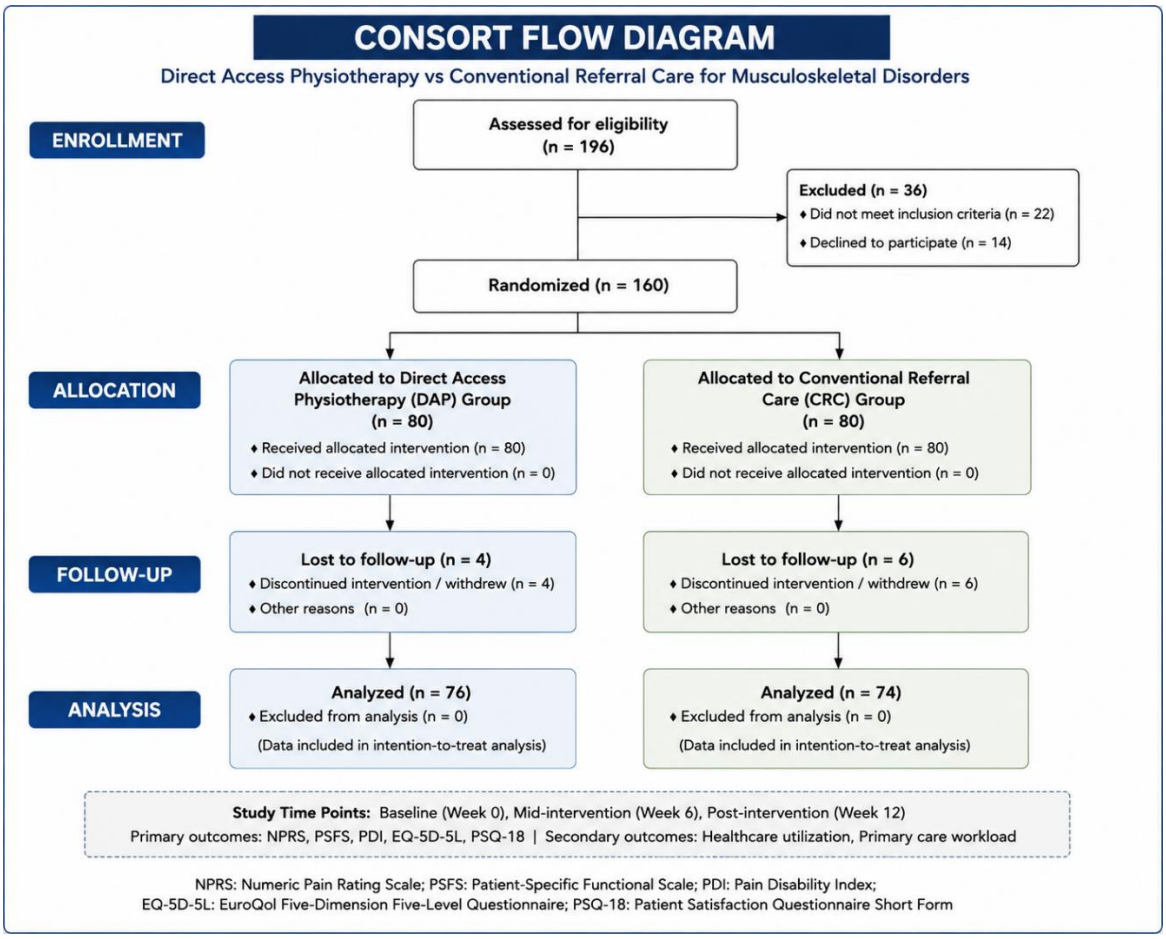

Figure 1. *CONSORT Flow Diagram of Participant Recruitment, Randomization, Follow-up, and Analysis*

Baseline Characteristics

No statistically significant differences were observed between groups regarding age, sex distribution, body mass index, symptom duration, or baseline outcome measures ($p > 0.05$), indicating successful randomization.

Table 3. Baseline Characteristics

Variable	DAP (n=80)	CRC (n=80)	p-value
Age (years)	42.6 ± 11.4	43.1 ± 10.9	0.79
Male, n (%)	37 (46.2)	35 (43.8)	0.76
Female, n (%)	43 (53.8)	45 (56.2)	0.76
BMI (kg/m²)	26.8 ± 4.1	27.1 ± 4.3	0.64
Symptom duration	5.8 ± 3.2	6.1 ± 3.5	0.58

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(months)			
NPRS Score	6.9 ± 1.4	7.0 ± 1.5	0.68
PDI Score	47.5 ± 10.7	48.2 ± 11.3	0.71
PSFS Score	41.8 ± 12.1	40.7 ± 11.8	0.61
EQ-5D-5L Index	0.55 ± 0.12	0.54 ± 0.11	0.72
PSQ-18 score	5.9 ± 1.1	5.8 ± 1.0	0.67

Clinical Outcomes

Mixed repeated-measures ANOVA demonstrated significant Group × Time interaction effects for NPRS ($p<0.001$), PDI ($p<0.001$), PSFS ($p<0.001$), EQ-5D-5L ($p=0.002$), and PSQ-18 ($p=0.001$), indicating greater improvements among participants receiving direct access physiotherapy over the 12-week intervention period.

Table 4. Clinical Outcomes at Baseline, Week 6 and Week 12

Outcome	Time Point	DAP (n=76)	CRC (n=74)	Between-Group p-value	Group × Time Interaction (p-value)
NPRS	Baseline	6.9 ± 1.4	7.0 ± 1.5	0.68	<0.001
	Week 6	4.3 ± 1.2	5.7 ± 1.4	<0.001	
	Week 12	2.8 ± 1.3	4.1 ± 1.8	<0.001	
PDI	Baseline	47.5 ± 10.7	48.2 ± 11.3	0.71	<0.001
	Week 6	32.4 ± 9.1	38.8 ± 10.2	0.004	
	Week 12	21.4 ± 8.6	29.7 ± 9.4	<0.001	
PSFS	Baseline	41.8 ± 12.1	40.7 ± 11.8	0.61	<0.001
	Week 6	61.5 ± 11.4	54.3 ± 12.1	0.008	
	Week 12	78.6 ± 11.2	68.1 ± 12.9	<0.001	
EQ-5D-5L	Baseline	0.55 ± 0.12	0.54 ± 0.11	0.72	0.002
	Week 6	0.69 ± 0.10	0.63 ± 0.12	0.011	
	Week 12	0.82 ± 0.09	0.73 ± 0.11	0.002	
PSQ-18	Baseline	5.9 ± 1.1	5.8 ± 1.0	0.67	0.001
	Week 6	7.4 ± 1.3	6.5 ± 1.2	0.003	
	Week 12	8.7 ± 1.2	7.4 ± 1.5	0.001	

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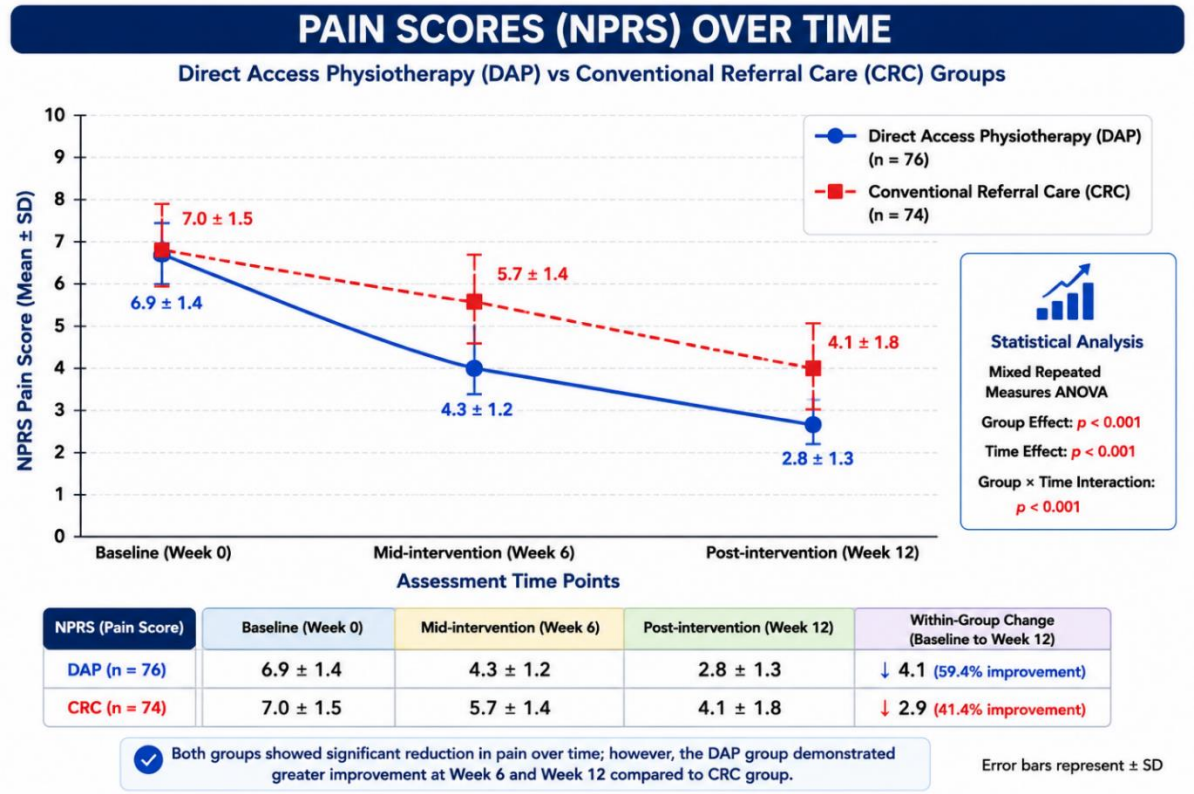

Figure 2. *Comparison of Numeric Pain Rating Scale (NPRS) Scores Between Direct Access Physiotherapy (DAP) and Conventional Referral Care (CRC) Groups at Baseline, Week 6, and Week 12*

Healthcare Utilization

Participants who managed through direct access physiotherapy required fewer physician consultations, underwent fewer imaging investigations, and received fewer medication prescriptions compared with participants receiving conventional referral care.

Table 5. Healthcare Utilization

Variable	DAP	CRC	p-value
Physician consultations	1.3 ± 0.7	3.1 ± 1.1	<0.001
Physiotherapy visits	5.6 ± 1.9	4.8 ± 2.0	0.032
Imaging requests	18 (22.5%)	37 (46.2%)	0.003
Medication prescriptions	26 (32.5%)	49 (61.2%)	<0.001
Specialist referrals	7 (8.8%)	16 (20.0%)	0.041
Emergency visits	3 (3.8%)	6 (7.5%)	0.31

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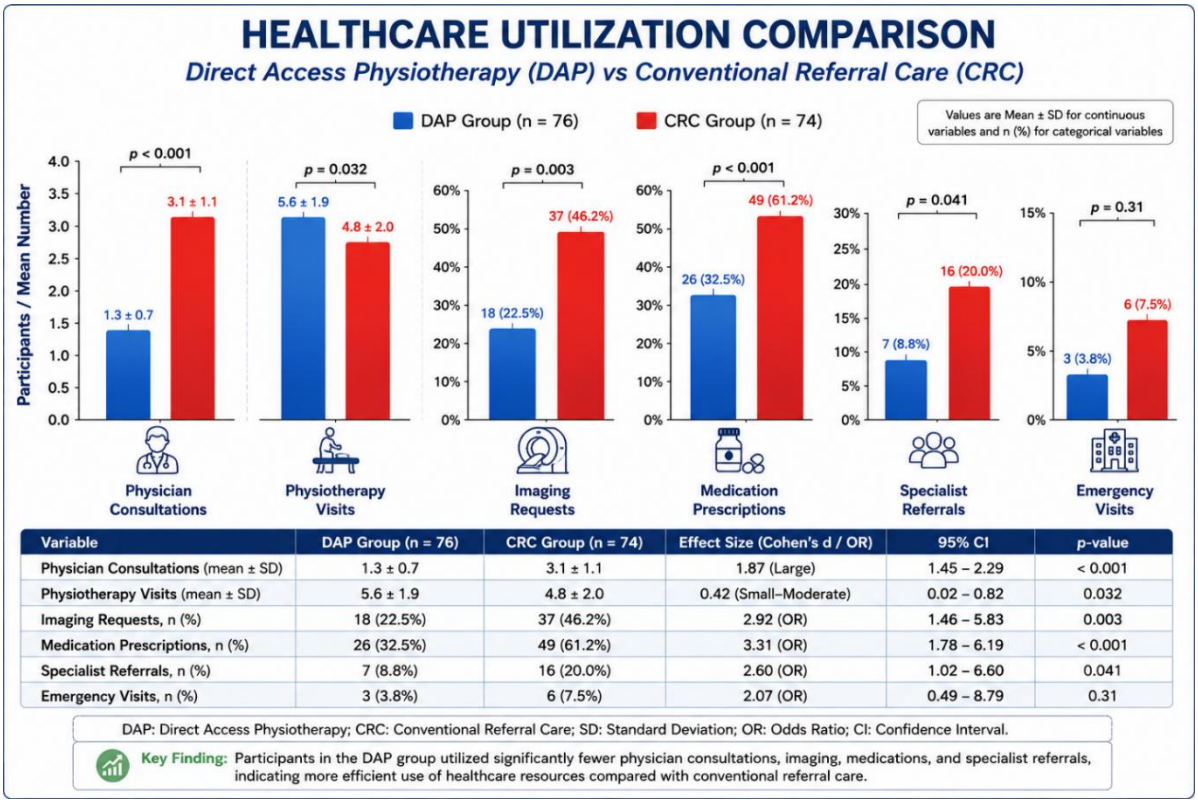

Variable	DAP Group (n = 76)	CRC Group (n = 74)	Effect Size (Cohen's d / OR)	95% CI	p-value
Physician Consultations (mean ± SD)	1.3 ± 0.7	3.1 ± 1.1	1.87 (Large)	1.45 – 2.29	< 0.001
Physiotherapy Visits (mean ± SD)	5.6 ± 1.9	4.8 ± 2.0	0.42 (Small–Moderate)	0.02 – 0.82	0.032
Imaging Requests, n (%)	18 (22.5%)	37 (46.2%)	2.92 (OR)	1.46 – 5.83	0.003
Medication Prescriptions, n (%)	26 (32.5%)	49 (61.2%)	3.31 (OR)	1.78 – 6.19	< 0.001
Specialist Referrals, n (%)	7 (8.8%)	16 (20.0%)	2.60 (OR)	1.02 – 6.60	0.041
Emergency Visits, n (%)	3 (3.8%)	6 (7.5%)	2.07 (OR)	0.49 – 8.79	0.31

Figure 3. *Comparison of Healthcare Utilization Indicators Between Direct Access Physiotherapy and Conventional Referral Care Groups*

Primary Care Workload

Direct access physiotherapy was associated with a significant reduction in primary care workload indicators.

Table 6. Primary Care Workload Indicators

Variable	DAP	CRC	p-value
Consultation frequency	1.3 ± 0.7	3.1 ± 1.1	<0.001
Consultation duration (minutes)	9.4 ± 2.3	14.8 ± 3.1	<0.001
Referral burden (%)	8.8	20.0	0.041
Follow-up consultations	1.1 ± 0.6	2.4 ± 1.0	<0.001

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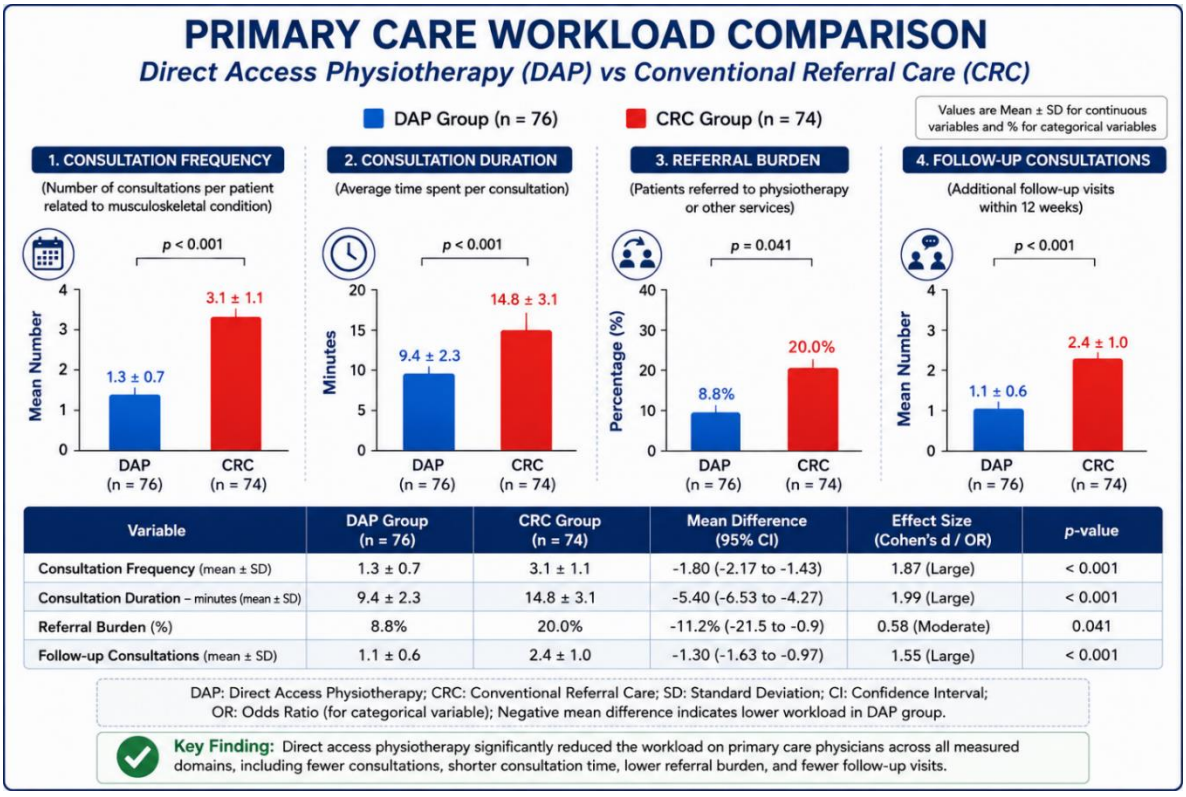

Variable	DAP Group (n = 76)	CRC Group (n = 74)	Mean Difference (95% CI)	Effect Size (Cohen's d / OR)	p-value
Consultation Frequency (mean ± SD)	1.3 ± 0.7	3.1 ± 1.1	-1.80 (-2.17 to -1.43)	1.87 (Large)	< 0.001
Consultation Duration – minutes (mean ± SD)	9.4 ± 2.3	14.8 ± 3.1	-5.40 (-6.53 to -4.27)	1.99 (Large)	< 0.001
Referral Burden (%)	8.8%	20.0%	-11.2% (-21.5 to -0.9)	0.58 (Moderate)	0.041
Follow-up Consultations (mean ± SD)	1.1 ± 0.6	2.4 ± 1.0	-1.30 (-1.63 to -0.97)	1.55 (Large)	< 0.001

Figure 4. ***Comparison of Primary Care Workload Indicators Between Direct Access Physiotherapy and Conventional Referral Care Groups***

Adverse Events

No serious adverse events were reported during the study period. Mild transient soreness following therapeutic exercise was reported by six participants (7.5%) in the DAP group and five participants (6.3%) in the CRC group. All symptoms were resolved spontaneously within 48 hours without additional medical intervention.

Discussion

The present randomized controlled trial evaluated the effectiveness of direct access physiotherapy in musculoskeletal care by examining clinical outcomes, healthcare utilization, and primary care workload among patients attending a tertiary care teaching hospital in Peshawar. The findings suggested that direct access physiotherapy was associated with improved patient outcomes, reduced healthcare utilization, and decreased burden on primary care services compared with the conventional physician-led referral pathway.

Musculoskeletal disorders continue to represent a major challenge for healthcare systems globally because of their high prevalence, recurrent nature, and substantial contribution to disability and healthcare expenditures(1-3). Within many healthcare systems, including Pakistan, patients with

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musculoskeletal complaints traditionally access physiotherapy services through physician referrals. Although this model remains widely practiced, it may contribute to delays in rehabilitation, repeated consultations, increased diagnostic investigations, and inefficient utilization of healthcare resources. The present study explored an alternative model of care and demonstrated the potential advantages of physiotherapy-led direct access services.

The observed improvements in clinical outcomes among participants receiving direct access physiotherapy are consistent with previous literature demonstrating the effectiveness of early physiotherapy intervention in musculoskeletal management. Earlier access to physiotherapy may facilitate timely assessment, identification of impairments, individualized treatment planning, and initiation of evidence-based rehabilitation strategies. Such interventions may contribute to reductions in pain, improvement in functional capacity, and enhancement of patient-reported health outcomes. Similar observations have been reported by Gallotti et al., who identified favorable disability outcomes, improved quality of life, and high levels of patient satisfaction among individuals managed through direct access physiotherapy pathways. Their systematic review also highlighted the safety and clinical effectiveness of autonomous physiotherapy practice within musculoskeletal healthcare settings (9).

Another important finding of the present study relates to healthcare utilization. Participants who managed through direct access physiotherapy demonstrated lower utilization of healthcare resources, including physician consultations, diagnostic investigations, medication prescriptions, and specialist referrals. These findings align with growing international evidence indicating that direct access models can promote more efficient healthcare delivery. Reduced dependence on physician appointments and diagnostic procedures may lead to considerable cost savings for healthcare institutions and patients while simultaneously enhancing access to rehabilitation services.

Previous investigations have similarly demonstrated that direct access physiotherapy can optimize healthcare utilization patterns. Babatunde et al. reported that self-referral and non-medical triage pathways were associated with shorter waiting times, fewer imaging requests, and more efficient allocation of healthcare resources (10). Likewise, recent evidence from Europe has suggested that direct access services may decrease unnecessary investigations and reduce medication use without compromising patient safety or treatment effectiveness (11, 12). The findings of the present study further support these observations and provide preliminary evidence for the feasibility of implementing such models within Pakistani healthcare settings.

An equally important aspect of this investigation was the assessment of primary care workload. Musculoskeletal conditions account for a substantial proportion of consultations within primary healthcare services and contribute significantly to physician burden. The findings indicated that direct access physiotherapy may reduce consultation frequency, shorten consultation duration, and decrease follow-up visits associated with musculoskeletal disorders. This reduction in workload may enable physicians to dedicate greater attention to patients with complex medical conditions requiring specialist evaluation and management.

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These findings are supported by studies examining the system-level impact of direct access services. Bishop and colleagues demonstrated that direct access physiotherapy contributed to reductions in musculoskeletal-related consultations within general practice settings, thereby improving healthcare efficiency (6). Similarly, longitudinal evaluations have reported meaningful reductions in primary care workload following implementation of direct access physiotherapy pathways (13). Such evidence is particularly relevant for healthcare systems experiencing increasing patient volumes, workforce shortages, and resource constraints.

The implementation of direct access physiotherapy may have significant implications for healthcare policy and service delivery in Pakistan. Rehabilitation services remain underutilized despite the growing burden of musculoskeletal disorders. Limited awareness regarding physiotherapy autonomy, insufficient rehabilitation infrastructure, and traditional referral practices may hinder timely access to evidence-based care. Incorporating direct access physiotherapy within healthcare systems could potentially improve patient access, optimize resource allocation, and enhance interdisciplinary collaboration between physiotherapists and physicians.

From a clinical perspective, direct access physiotherapy may facilitate earlier rehabilitation, encourage patient-centered care, and support self-management strategies. Early intervention has been associated with improved symptom resolution, reduced chronicity, and decreased dependence on pharmacological treatments. Moreover, physiotherapists possess the competencies necessary for screening, differential diagnosis within their professional scope, and identification of conditions requiring medical referral, which supports the safety of autonomous practice.

The present study contributes to the limited body of evidence regarding direct access physiotherapy within low- and middle-income countries. Most existing literature originates from Europe, North America, and other developed healthcare systems. Consequently, evidence generated from Pakistani healthcare institutions is valuable in informing future service planning and policy development. The findings of this study may serve as a foundation for larger multicenter investigations evaluating long-term clinical effectiveness, economic implications, and patient experiences associated with direct access physiotherapy.

Strengths of the Study

This study employed a randomized controlled trial design, which represents one of the most rigorous approaches for evaluating healthcare interventions. Random allocation minimized selection bias and enhanced internal validity. Furthermore, the study simultaneously examined clinical outcomes, healthcare utilization, and primary care workload, providing a comprehensive assessment of the potential impact of direct access physiotherapy.

Limitations of the Study

Several limitations should be considered while interpreting the findings. The study was conducted in a single tertiary care institution, which may limit generalizability to other healthcare settings. The duration of follow-up may have been insufficient to evaluate long-term sustainability of clinical

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improvements and healthcare utilization patterns. In addition, participant and therapist blinding was not feasible because of the nature of the intervention, which may have introduced performance bias. Future multicenter studies with longer follow-up periods and economic evaluations are warranted to strengthen the evidence base for direct access physiotherapy within developing healthcare systems.

Conclusion

Direct access physiotherapy demonstrated promising benefits in the management of musculoskeletal disorders by improving clinical outcomes, reducing healthcare utilization, and decreasing the workload of primary care services. The findings suggest that physiotherapy-led direct access pathways may represent an effective and efficient model of musculoskeletal care within tertiary healthcare settings in Pakistan.

Adoption of direct access physiotherapy has the potential to facilitate timely rehabilitation, optimize healthcare resource utilization, reduce unnecessary physician consultations and diagnostic investigations, and improve overall healthcare delivery. Policymakers, healthcare administrators, and professional bodies should consider the integration of direct access physiotherapy models into routine clinical practice to address the increasing burden of musculoskeletal disorders and enhance accessibility to rehabilitation services.

Further multicenter randomized controlled trials incorporating cost-effectiveness analyses and long-term follow-up assessments are recommended to establish the broader applicability and sustainability of direct access physiotherapy within the Pakistani healthcare system.

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