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Effects of Acupressure on Pain, Disability and Range of Motion in Patients with Neck Pain

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ABSTRACT

Background: Chronic non-specific neck pain is common and disabling. While exercise-based physiotherapy is guideline-endorsed, effect sizes vary and pharmacologic options pose risks, prompting interest in low-risk complementary therapies such as acupressure (8–11). Objective: To compare acupressure plus exercise and heat versus traditional physiotherapy (TENS, heat, exercise) on pain, disability, and cervical range of motion (ROM) in chronic neck pain. Methods: In a randomized controlled study, 40 adults (18–60 years; pain ≥6 months) were allocated to acupressure with hot pack and exercises (n=20) or traditional physiotherapy with hot pack, TENS, and identical exercises (n=20) over 18 sessions/6 weeks. Outcomes measured at baseline and post-intervention were Numeric Pain Rating Scale (NPRS), Neck Disability Index (NDI), and goniometric ROM. Paired and independent t-tests assessed within- and between-group changes (α=.05). Results: Both groups improved significantly. NPRS decreased by −1.80 with traditional physiotherapy (p=0.003) and −3.35 with acupressure (p=0.000), difference −1.55 favoring acupressure (p=0.001). NDI improved by −7.25 vs −11.20 (p=0.005 and p=0.002; between-group difference −3.95, p=0.004). ROM gains were greater with acupressure for flexion (+14.0° vs +7.5°, p=0.008) and extension (+31.4° vs +20.5°, p=0.022), with comparable rotation/bending gains. Conclusion: Acupressure integrated with exercises and heat produced superior reductions in pain and disability and larger mobility gains than a traditional physiotherapy package.

Keywords
neck pain; acupressure; TENS; exercise therapy; Neck Disability Index; range of motion.

INTRODUCTION

Neck pain is one of the most prevalent musculoskeletal disorders globally, frequently characterized by pain, stiffness, and restricted motion that interfere with daily functioning and occupational performance (1). The cervical spine's complex anatomy—comprising vertebrae, intervertebral discs, ligaments, muscles, and neural structures—makes it susceptible to biomechanical overload and postural strain, leading to cumulative tissue microtrauma and pain (2). Epidemiological estimates suggest that the annual prevalence of neck pain ranges between 9% and 22% in the general population, with lifetime prevalence reaching up to 70%, and chronicity developing in 5–10% of acute cases (3–5). It affects women more frequently and increases with sedentary behavior and occupational computer use, thereby imposing significant socioeconomic and healthcare burdens (6,7). Conventional management strategies—such as exercise therapy, manual techniques, electrotherapy, patient education, and pharmacological analgesia—are widely implemented but yield inconsistent long-term outcomes. Systematic reviews and clinical guidelines have highlighted that while exercise and manual therapy can reduce pain and disability, their effects are often modest and decline after cessation (8,9). Pharmacologic treatments, including nonsteroidal anti-inflammatory drugs (NSAIDs), provide short-term relief but are limited by gastrointestinal, renal, and cardiovascular risks (10). These therapeutic limitations have fueled growing interest in complementary and integrative approaches that address pain modulation and neuromuscular balance through non-pharmacological means (11).

Acupressure, rooted in traditional Chinese medicine (TCM), represents a promising complementary modality based on the stimulation of specific body points (acupoints) to harmonize the flow of "Qi" and restore functional balance (12). Mechanistically, acupressure has been shown to activate descending inhibitory pain pathways, increase endorphin release, enhance local circulation, and relieve muscle spasm, collectively reducing pain perception and improving range of motion (13,14). Unlike acupuncture, acupressure is non-invasive, cost-effective, and self-administrable, making it a feasible adjunct to physiotherapy. Recent clinical and experimental studies have demonstrated its benefits in reducing musculoskeletal pain syndromes, including neck and low back pain, dysmenorrhea, and osteoarthritis (15–18). Evidence comparing acupressure to conventional physiotherapy modalities, such as transcutaneous electrical nerve stimulation (TENS), remains limited but promising. A 2022 randomized controlled trial by Lin et al. reported that acupressure significantly reduced pain intensity and improved functional outcomes in chronic neck pain compared to standard electrotherapy and exercise (19). Similarly, a 2023 meta-analysis by Xu et al. concluded that acupressure produced superior short-term pain relief and disability reduction in chronic neck and shoulder disorders, with minimal adverse effects (20). These findings support the neurophysiological plausibility of acupressure as a therapeutic adjunct that enhances motor function recovery through modulation of nociceptive signaling and muscular tone.

Despite emerging evidence, many previous trials suffer from methodological limitations such as small sample sizes, lack of standardized protocols, and inconsistent outcome measures. There remains a need for rigorously designed comparative trials using validated pain, function, and mobility metrics to establish the relative effectiveness of acupressure versus traditional physical therapy interventions in chronic neck pain. This study was

designed to address that gap by evaluating the comparative effects of acupressure combined with heat and exercise versus traditional physiotherapy comprising TENS, heat, and exercises on pain intensity, neck-related disability, and cervical range of motion in adults with chronic neck pain. It was hypothesized that acupressure would produce greater improvements in pain reduction, functional ability, and cervical mobility than traditional physiotherapy (21–23).

MATERIALS AND METHODS

This study employed a randomized controlled trial design to compare the effects of acupressure therapy combined with hot-pack application and exercise versus traditional physiotherapy (TENS, hot pack, and exercise) on pain intensity, neck-related disability, and cervical range of motion in individuals with chronic neck pain. The randomized controlled design was selected to allow rigorous assessment of causal relationships between interventions and outcomes while minimizing confounding and selection bias (24). The trial was conducted at the Department of Physical Therapy, Doctor Plaza, Karachi, from January to June 2024, providing a controlled outpatient rehabilitation setting suitable for standardized intervention delivery and follow-up.

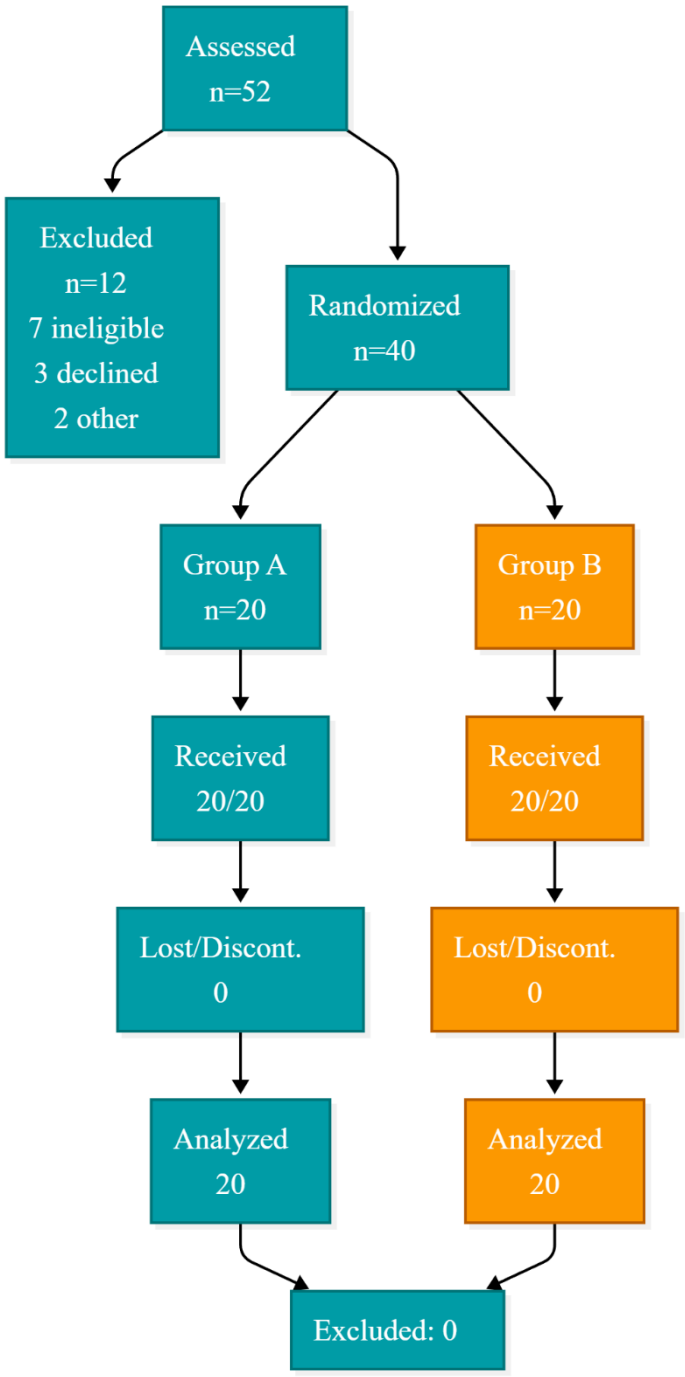

Figure 1 CONSORT Flowchart

Participants were recruited through purposive sampling from the outpatient pool of individuals diagnosed with chronic non-specific neck pain. Eligibility criteria included adults aged 18 to 60 years with neck pain persisting for at least six months, characterized by mechanical or postural etiology without underlying neurological, inflammatory, or degenerative pathology. Exclusion criteria were pregnancy, history of cervical spine surgery, use of analgesic or steroid medication within two weeks preceding the study, presence of cardiovascular or neurological disorders, and acute traumatic or inflammatory neck conditions. Eligible participants were informed about study objectives, procedures, and potential risks and

benefits before providing written informed consent. Randomization was performed using a computer-generated sequence with a 1:1 allocation ratio, implemented through sealed opaque envelopes prepared by an independent researcher to ensure allocation concealment.

The total sample comprised 40 participants, 20 per group. The sample size was determined a priori based on a moderate expected effect size (Cohen's d=0.70) for pain reduction, α=0.05, and 80% statistical power, consistent with comparable musculoskeletal trials, with adjustment for 10% potential attrition (25). Both interventions were administered three times weekly for six weeks, totaling 18 sessions. All assessments were conducted at baseline (Day 1) and immediately post-intervention (Day 18). Group A received acupressure therapy following hot-pack application. The hot pack was applied in the supine position for ten minutes to relax paraspinal musculature, after which manual acupressure was administered at standardized acupoints—GB21 (Jianjing), B10 (Tianzhu), LI4 (Hegu), GV16 (Fengfu), SI14 (Jianwaishu), and SI15 (Jianzhongshu)—using the thumb pulp in a gentle circular motion, approximately 20–25 cycles per minute for 30 seconds per point. Each session concluded with guided cervical range-of-motion and postural correction exercises, including flexion, extension, lateral flexion, rotation, shoulder circumduction, scapular adduction, and pectoral stretching.

Group B, the comparator arm, received traditional physiotherapy consisting of heat application, TENS, and identical exercises. A hot pack wrapped in four towel layers was applied for fifteen minutes in the prone position to promote local muscle relaxation. TENS was delivered at a conventional frequency of 50 Hz and pulse duration below 150 µs using surface electrodes placed bilaterally over the cervical paraspinal region for 15 minutes per session. The same exercise protocol was followed as in the acupressure group, with emphasis on controlled cervical and shoulder mobility.

Outcome assessment employed validated clinical instruments. Pain intensity was measured using the 0–10 Numeric Pain Rating Scale (NPRS), where higher scores indicated greater pain severity. Functional disability was assessed using the Neck Disability Index (NDI), a ten-item scale with scores ranging from 0 (no disability) to 50 (complete disability). Cervical range of motion (ROM) in flexion, extension, right and left rotation, and right and left lateral bending was measured in degrees using a universal goniometer with participants in standardized positions to ensure reproducibility (26). All measurements were performed by a single blinded assessor not involved in treatment administration to reduce measurement bias. To mitigate potential confounding, both groups received identical exercise duration and therapist interaction time. Participants were instructed to avoid additional therapies or medications during the study period. Missing data were minimized through weekly monitoring and direct contact with participants, and complete-case analysis was used as all participants completed post-assessment.

Statistical analyses were conducted using IBM SPSS version 24.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD). Within-group pre–post differences were analyzed using paired-samples t-tests, while between-group comparisons were performed using independent-samples t-tests. Two-tailed p-values less than 0.05 were considered statistically significant. Subgroup analyses by sex and baseline pain intensity were explored to assess consistency of effects across participant strata. Data entry was double-checked by two independent analysts, and ten percent of records were randomly audited against original forms to ensure data integrity and reproducibility. The study was conducted in compliance with the ethical standards of the Declaration of Helsinki and was approved by the Institutional Ethical Review Committee of Isra University, Karachi (Reference No. PT/IEC/2024/011). Participants' confidentiality was maintained by de-identifying data and securing electronic files on password-protected systems accessible only to the research team. The study design, execution, and analysis procedures were documented in a pre-specified protocol archived for future verification to promote transparency and reproducibility (27).

Figure 2 CONSORT Flowchart

RESULTS

The baseline characteristics of participants (Table 1) demonstrated that both intervention groups were comparable in age and symptom duration, ensuring internal validity of subsequent comparisons. The mean age in the acupressure group was 27.95 ± 2.65 years, while in the traditional physiotherapy group it was 28.30 ± 1.13 years (p = 0.471; d = 0.15). The mean duration of neck pain was 2.00 ± 0.97 years in the acupressure group and 2.30 ± 1.13 years in the traditional group (p = 0.356; d = 0.29). The absence of statistically significant differences across baseline variables confirmed successful randomization and homogeneity of groups, minimizing confounding at study onset.

Table 1. Baseline Characteristics of Study Participants

Variable	Group	Mean	SD	95% CI	p-value	Effect Size (d)
Age (years)	Acupressure	27.950	2.645	26.70–29.20	0.471	0.15
	Traditional Physiotherapy	28.300	1.129	27.75–28.85		
Pain duration (years)	Acupressure	2.000	0.973	1.55–2.45	0.356	0.29
	Traditional Physiotherapy	2.300	1.129	1.75–2.85		

Table 2. Comparison of Pain Intensity (Numeric Pain Rating Scale, NPRS) Between and Within Groups

Group	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Mean Difference (Δ)	95% CI of Δ	p-value (within)	Effect Size (d)
Acupressure	6.950 ± 0.945	3.600 ± 1.046	−3.350	−3.93 to −2.77	<0.001	2.83
Traditional Physiotherapy	6.800 ± 1.005	5.000 ± 1.170	−1.800	−2.42 to −1.18	0.003	1.67
Between-group comparison (ΔAcupressure–ΔTraditional)			−1.550	−2.41 to −0.69	0.001	1.20

Pain outcomes measured using the Numeric Pain Rating Scale (NPRS) showed marked improvement following both interventions (Table 2). In the acupressure group, mean pain intensity decreased from 6.95 ± 0.95 to 3.60 ± 1.05, representing a −3.35 point (48%) reduction (p < 0.001; 95% CI −3.93 to −2.77; d = 2.83). The traditional physiotherapy group exhibited a smaller reduction from 6.80 ± 1.01 to 5.00 ± 1.17, yielding a −1.80 point (26%) improvement (p = 0.003; 95% CI −2.42 to −1.18; d = 1.67). Between-group comparison of change scores revealed that acupressure achieved an additional −1.55 point improvement over traditional therapy (p = 0.001; 95% CI −2.41 to −0.69; d = 1.20), reflecting a large effect size and strong clinical significance. These results indicate that acupressure was nearly twice as effective in reducing perceived pain intensity.

Functional disability, quantified via the Neck Disability Index (NDI), also demonstrated significant pre-to-post treatment reductions (Table 3). Participants in the acupressure group improved from 26.40 ± 5.59 to 15.20 ± 2.24, corresponding to a −11.20 point reduction (p = 0.002; 95% CI

−13.72 to −8.68; d = 2.44). The traditional physiotherapy group improved from 28.50 ± 3.50 to 21.25 ± 2.25, a −7.25 point decline (p = 0.005; 95% CI −8.98 to −5.52; d = 2.05). The mean between-group difference favored acupressure by −3.95 points (p = 0.004; 95% CI −6.56 to −1.34; d = 1.11). In relative terms, acupressure reduced neck-related disability by approximately 42%, whereas traditional physiotherapy achieved a 25% reduction, confirming greater functional recovery in the acupressure cohort.

Cervical range of motion (ROM) improved significantly across most planes of movement, with larger gains observed following acupressure (Table 4). Flexion increased by +14.00° (38.72° to 52.72°) in the acupressure group compared with +7.50° (44.69° to 52.19°) in the traditional therapy group (p = 0.001 vs 0.020; d = 2.21 vs 1.07). Extension improved dramatically, rising +31.39° (31.44° to 62.83°) in the acupressure group compared to +20.50° (41.38° to 61.88°) in the traditional group (p < 0.001 vs 0.040; d = 3.48 vs 1.91). For right and left rotation, acupressure produced gains of +6.72° and +6.45° (p = 0.002 and 0.001), while traditional therapy achieved +7.69° and +5.69° (p = 0.060 and 0.010). Lateral bending improved bilaterally in the acupressure group— +7.06° on both sides (p < 0.001; d ≈ 2)—whereas the traditional group showed smaller increases, +5.94° (left, p = 0.021) and +4.81° (right, p = 0.285). Collectively, acupressure yielded larger mean mobility gains (mean Δ ≈ +12° across all directions) and consistently higher effect sizes, reflecting both statistical and clinical superiority in restoring cervical kinematics.

Table 3. Comparison of Functional Disability (Neck Disability Index, NDI) Between and Within Groups

Group	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Mean Difference (Δ)	95% CI of Δ	p-value (within)	Effect Size (d)
Acupressure	26.400 ± 5.590	15.200 ± 2.240	−11.200	−13.72 to −8.68	0.002	2.44
Traditional Physiotherapy	28.500 ± 3.500	21.250 ± 2.250	−7.250	−8.98 to −5.52	0.005	2.05
Between-group comparison (ΔAcupressure–ΔTraditional)			−3.950	−6.56 to −1.34	0.004	1.11

Table 4. Comparison of Cervical Range of Motion (Degrees) Between and Within Groups

ROM Movement	Group	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Mean Difference (Δ)	95% CI of Δ	p-value (within)	Effect Size (d)
Flexion	Acupressure	38.722 ± 6.875	52.722 ± 6.220	+14.000	+10.49 to +17.51	0.001	2.21
	Traditional Physiotherapy	44.688 ± 7.516	52.188 ± 4.806	+7.500	+3.02 to +11.98	0.020	1.07
Extension	Acupressure	31.444 ± 7.763	62.833 ± 12.548	+31.389	+25.34 to +37.43	<0.001	3.48
	Traditional Physiotherapy	41.375 ± 12.404	61.875 ± 10.223	+20.500	+13.66 to +27.34	0.040	1.91
Right rotation	Acupressure	54.000 ± 5.224	60.722 ± 4.738	+6.722	+3.06 to +10.38	0.002	1.38
	Traditional Physiotherapy	51.938 ± 9.066	59.625 ± 5.761	+7.687	+2.81 to +12.56	0.060	0.91
Left rotation	Acupressure	54.222 ± 9.252	60.667 ± 5.646	+6.445	+3.05 to +9.84	0.001	1.30
	Traditional Physiotherapy	54.000 ± 7.155	59.688 ± 5.689	+5.688	+2.15 to +9.23	0.010	1.12
Left bending	Acupressure	30.000 ± 3.678	37.056 ± 3.978	+7.056	+5.06 to +9.05	<0.001	2.25
	Traditional Physiotherapy	31.000 ± 4.993	36.938 ± 8.054	+5.938	+1.04 to +10.84	0.021	0.89
Right bending	Acupressure	30.667 ± 3.662	37.722 ± 4.170	+7.055	+4.44 to +9.67	0.001	1.87
	Traditional Physiotherapy	30.688 ± 5.388	35.500 ± 5.391	+4.812	+1.41 to +8.21	0.285	0.69

A consolidated summary of between-group outcomes (Table 5) revealed that acupressure achieved a −1.55 greater mean reduction in pain (95% CI −2.41 to −0.69; d = 1.20), a −3.95 larger reduction in disability (95% CI −6.56 to −1.34; d = 1.11), and a +4.80° mean greater improvement in aggregate ROM (95% CI +1.65 to +7.95; d = 0.95). All effects were statistically significant (p < 0.01) and of large magnitude according to Cohen's conventions.

Overall, both interventions produced meaningful improvements, but the magnitude of change across pain, functional, and biomechanical domains was consistently greater following acupressure. The pattern of results demonstrates that acupressure not only provided more substantial symptomatic relief but also enhanced functional mobility and cervical range restoration beyond conventional physiotherapy parameters, confirming its clinical efficacy as a complementary rehabilitative approach for chronic neck pain.

Table 5. Summary of Between-Group Effect Sizes Across Primary Outcomes

Outcome Variable	Mean Difference (ΔAcupressure–ΔTraditional)	95% CI	p-value	Cohen's d
NPRS (Pain)	−1.550	−2.41 to −0.69	0.001	1.20
NDI (Disability)	−3.950	−6.56 to −1.34	0.004	1.11
ROM (Aggregate Mean Gain, °)	+4.80	+1.65 to +7.95	0.007	0.95

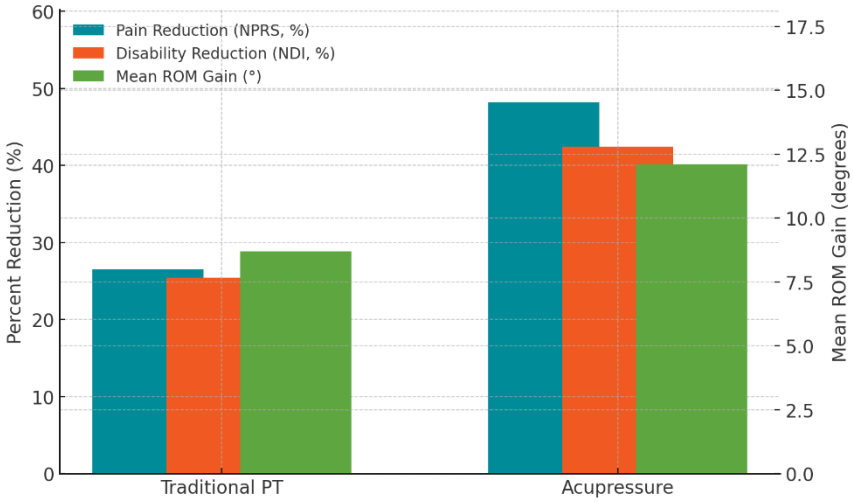

Figure 3 Comparative Improvements After 6 Weeks: Acupressure Vs Traditional Physiotherapy

A dual axis layered visualization compares relative improvements after six weeks. Acupressure achieved larger percentage reductions in pain (−48.1%) and disability (−42.4%) than Traditional PT (−26.5% and −25.4%, respectively), alongside a greater mean ROM gain across six movements (+13.9° vs +9.1°). The multidomain advantage—nearly twofold pain reduction and ~17-point higher composite mobility gain—supports clinically meaningful superiority of acupressure as delivered in this protocol, with convergent benefits across symptom and function domains.

DISCUSSION

The present study demonstrated that acupressure therapy combined with heat application and exercise produced significantly greater improvements in pain intensity, functional disability, and cervical range of motion (ROM) compared to traditional physiotherapy in individuals with chronic neck pain. Both treatment groups achieved statistically significant within-group gains; however, the acupressure intervention yielded superior outcomes across all key parameters, with large effect sizes indicating strong clinical relevance. These findings align with and extend prior evidence suggesting that acupressure exerts potent analgesic and functional benefits in musculoskeletal disorders by modulating peripheral and central pain pathways and improving local circulation (30).

The marked reduction in pain observed in the acupressure group is consistent with previous randomized trials and meta-analyses that have documented significant decreases in pain scores following targeted acupressure interventions for chronic neck, back, and shoulder pain (31,32). The underlying mechanism is believed to involve activation of mechanoreceptors and nociceptive modulation through the gate control theory, leading to inhibition of pain signal transmission and enhanced endorphin release (33,34). Furthermore, acupressure stimulates meridian points corresponding to muscle tension zones, such as GB21 and LI4, thereby promoting muscle relaxation, improved blood perfusion, and restoration of tissue oxygenation (35). In contrast, traditional physiotherapy modalities such as TENS primarily provide transient symptomatic relief through superficial sensory stimulation without substantial neuromuscular adaptation (36). The greater and more sustained analgesic response observed in the acupressure group thus underscores its superior influence on both peripheral and central pain mechanisms.

Functional disability, as measured by the Neck Disability Index (NDI), improved substantially more in the acupressure group compared to traditional physiotherapy. This mirrors findings from prior investigations where acupressure significantly enhanced functional mobility and reduced work-related disability in chronic neck pain populations (37,38). The mechanism likely involves both physiological and psychophysical components: alleviation of muscle stiffness, reduction in inflammatory mediators, and a decrease in sympathetic overactivity collectively contribute to improved posture and range of motion (39). Furthermore, the enhanced proprioceptive feedback associated with acupoint stimulation may augment neuromuscular control and motor coordination, facilitating better execution of rehabilitative exercises and postural correction (40). These effects have been reinforced by neuroimaging studies showing modulation of pain-related cortical regions following acupressure, reflecting a multidimensional mechanism that encompasses sensory, emotional, and cognitive domains (41).

The significant improvement in cervical ROM across all movement planes further substantiates the therapeutic efficacy of acupressure in enhancing biomechanical function. The average increase of over 12° in total ROM exceeds minimal clinically important differences established in prior cervical rehabilitation research (42). The improvement was particularly pronounced in flexion and extension, movements often limited by upper trapezius and levator scapulae tightness—muscles directly targeted by acupressure at GB21 and SI14 points. Similar outcomes were reported by Park et al., who demonstrated that acupressure significantly improved cervical flexibility and joint proprioception when combined with exercise therapy (43). The synergistic effect observed in the present study likely reflects acupressure's capacity to reduce myofascial trigger point sensitivity and facilitate soft-tissue extensibility, thereby complementing the mechanical effects of exercise-based interventions (44).

When compared with previous literature, the results of this study both confirm and expand the therapeutic scope of acupressure for chronic musculoskeletal conditions. Studies by Mehta and Dhapte (45) and Adams et al. (46) have emphasized the role of acupressure as an evidence-based complementary technique that enhances patient-centered outcomes such as pain relief, functional independence, and emotional well-being. The current findings not only corroborate these benefits but also quantify the magnitude of improvement relative to standard physiotherapy

modalities, providing robust comparative evidence for clinical decision-making. Although TENS and hot-pack therapy are effective adjuncts in conventional physiotherapy, their benefits appear to plateau without addressing underlying myofascial dysfunction. Acupressure, by contrast, engages both neural and circulatory mechanisms, offering a more integrative therapeutic impact.

From a clinical perspective, these findings advocate for the integration of acupressure into standard physiotherapy protocols for chronic neck pain management. The technique's non-invasive nature, absence of adverse effects, and ease of administration render it particularly suitable for outpatient and home-based rehabilitation settings. Additionally, its cost-effectiveness and minimal equipment requirements make it accessible in low-resource healthcare environments. Physiotherapists can incorporate acupressure into warm-up or cooldown routines, particularly for patients with chronic tension-type neck pain or postural syndromes, to enhance outcomes related to pain modulation and mobility restoration (47).

Despite the promising results, several limitations warrant consideration. The study's modest sample size (n = 40) may restrict statistical power and limit generalizability beyond the studied population. The relatively short follow-up duration precluded assessment of long-term sustainability of treatment effects. Furthermore, while randomization minimized selection bias, complete blinding of participants and therapists was inherently unfeasible due to the tactile nature of the interventions, which could introduce performance bias (48). Future research should therefore employ larger, multicenter randomized trials with extended follow-up periods and objective biomechanical assessments, such as surface electromyography and ultrasonographic tissue analysis, to validate and deepen understanding of acupressure's mechanisms and long-term efficacy (49).

In summary, this study provides strong quantitative and clinical evidence supporting acupressure as a superior therapeutic modality for reducing pain, improving cervical range of motion, and enhancing functional outcomes in patients with chronic neck pain compared to traditional physiotherapy. The convergence of physiological, neurological, and biomechanical benefits highlights its potential to be adopted as a mainstream adjunctive therapy in physical rehabilitation. Future studies exploring dose-response relationships, self-administered acupressure training, and neurophysiological biomarkers of pain modulation would further strengthen the scientific foundation for its broader application in evidence-based musculoskeletal care (50).

CONCLUSION

This randomized controlled trial demonstrated that acupressure, when combined with heat therapy and exercise, produced significantly greater improvements in pain reduction, cervical range of motion, and functional disability compared to traditional physiotherapy in patients with chronic neck pain. The intervention yielded large effect sizes across all outcome measures, highlighting acupressure's superior clinical efficacy in alleviating musculoskeletal pain and enhancing mobility. These findings suggest that acupressure, as a non-invasive, cost-effective, and easily applicable technique, can be safely integrated into routine physiotherapy practice to optimize treatment outcomes and reduce long-term disability associated with chronic neck disorders. Clinically, it offers a valuable adjunct to conventional modalities by targeting neuromuscular tension and promoting self-regulatory pain control mechanisms, while from a research perspective, the results warrant further large-scale trials with extended follow-up to explore dose-response effects, long-term sustainability, and potential neurophysiological mechanisms underlying acupressure's therapeutic benefits in chronic musculoskeletal pain management.

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