Long-Term Effects of Postural Training on Neck and Shoulder Pain in Office Workers: Assessing Sustained Impact and Efficacy

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Abstract

Background: Neck and shoulder pain is prevalent among office workers due to prolonged sitting and poor posture. Postural training has been suggested as a remedy, but its long-term effectiveness compared to other interventions remains unclear.

Objective: This study investigates the long-term effects of postural training on neck and shoulder pain among office workers and compares its outcomes with ergonomic adjustments and no intervention.

Methods: A randomized controlled trial was conducted with 150 office workers experiencing chronic neck and shoulder pain. Participants were divided into three groups: postural training, ergonomic adjustments, and control. Interventions lasted 12 weeks, with outcomes assessed at baseline, post-intervention, and at a 6-month follow-up. Primary measures included pain levels (VAS) and functional disability (NDI, SPADI). Secondary measures included postural alignment and quality of life (SF-36).

Results: The postural training group showed significant reductions in pain and functional disability compared to the ergonomic adjustments and control groups. Improvements in postural alignment and quality of life were also more notable in the postural training group. Ergonomic adjustments provided moderate benefits, while the control group showed minimal changes.

Conclusion: Postural training is an effective long-term intervention for reducing neck and shoulder pain and improving functional outcomes in office workers. The results support integrating postural training into occupational health programs.

Keywords: Postural Training, Neck Pain, Shoulder Pain, Office Workers, Ergonomic Adjustments, Functional Disability, Quality of Life

Introduction

Neck and shoulder pain are prevalent musculoskeletal disorders among office workers, often attributed to prolonged sitting, poor posture, and repetitive tasks (Safarian et al., 2019). The sedentary nature of office work, combined with inadequate ergonomic setups, contributes to the development and exacerbation of these conditions. A growing body of evidence suggests that postural training interventions can mitigate these issues by promoting better alignment and reducing muscular strain (Mehrparvar et al., 2014).

Postural training involves exercises and techniques aimed at improving body alignment and strengthening muscles to support correct posture. Research indicates that such interventions can lead to significant short-term improvements in pain and functional outcomes for individuals suffering from musculoskeletal complaints (Harris & McDonald, 2018). Despite these promising results, the long-term effects of postural training on neck and shoulder pain remain underexplored. Understanding whether the benefits of postural training are sustained over time is crucial for establishing its effectiveness as a preventive and therapeutic measure.

Previous studies have highlighted the benefits of postural training in reducing pain and improving function in the short term. For instance, a study by Tunwattanapong et al. (2016) found that office workers who engaged in postural exercises experienced a reduction in neck and shoulder discomfort and improved quality of life.

However, the duration of these effects and their persistence beyond the intervention period are not well-documented.

This study aims to address this gap by assessing the long-term impact of postural training on neck and shoulder pain among office workers. By evaluating the sustained effects of postural training interventions, this research seeks to provide valuable insights into the effectiveness and longevity of these programs in managing musculoskeletal pain.

Literature Review

Prevalence and Impact of Neck and Shoulder Pain in Office Workers: Neck and shoulder pain are common complaints among office workers, largely due to sedentary lifestyles and poor ergonomic practices. According to a study by Hoe et al. (2018), approximately 30% of office workers experience chronic neck and shoulder pain, which significantly affects their quality of life and productivity. Prolonged sitting and repetitive tasks contribute to muscular imbalances and postural strain, exacerbating these conditions (Safarian et al., 2019).

Postural Training Interventions: Postural training focuses on improving body alignment and strengthening muscles to support correct posture. Research shows that postural training can effectively reduce pain and improve functional outcomes in the short term. For instance, Tunwattanapong et al. (2016) reported that a postural exercise program led to significant reductions in neck and shoulder discomfort among office workers. These interventions often include exercises designed to enhance muscular endurance, flexibility, and posture correction.

Mechanisms of Postural Training: The effectiveness of postural training can be attributed to its impact on muscle strength, flexibility, and alignment Mehrparvar et al. (2014), discuss how postural exercises strengthen the muscles that support the spine and shoulders, leading to improved posture and reduced strain on musculoskeletal structures. This, in turn, can decrease pain and enhance overall functional ability. The training often involves exercises such as shoulder shrugs, neck stretches, and ergonomic adjustments to the workstation.

Short-Term Outcomes of Postural Training: Several studies have documented the short-term benefits of postural training. A meta-analysis by Harris and McDonald (2018) found that postural interventions resulted in significant pain reduction and improved functional status among participants with neck and shoulder pain. However, the majority of these studies have focused on the immediate or short-term effects, leaving a gap in understanding the long-term efficacy of such interventions.

Long-Term Effects and Sustainability: The sustainability of postural training benefits remains less explored. A study by Cheng et al. (2015) indicated that while postural training shows positive results in the short term, the long-term effects are less clear. Some research suggests that without ongoing practice, the benefits of postural training may diminish over time (Tunwattanapong et al., 2016). This highlights the need for further investigation into whether the initial improvements in pain and function are maintained in the long term and what factors influence the sustainability of these effects.

Comparative Studies: Comparative studies have examined the relative effectiveness of postural training versus other interventions. For example, a study by Habibi and Soury, (2015).compared postural training with ergonomic adjustments and found that while both interventions provided relief, postural training was more effective in reducing long-term pain and improving posture. This suggests that integrating postural training with other ergonomic strategies might offer a more comprehensive approach to managing musculoskeletal pain.

Gaps in Current Research: Despite the evidence supporting the benefits of postural training, several gaps remain. There is limited research on the long-term impact of these interventions, particularly in diverse populations and varying workplace settings. Additionally, the mechanisms underlying the sustained benefits of postural training are not well understood, necessitating further research to explore how long-term adherence to postural training impacts pain management and functional outcomes.

Methodology

Study Design: This study utilized a randomized controlled trial (RCT) design to assess the long-term effects of postural training on neck and shoulder pain among office workers. Participants were randomly assigned to one of three groups: postural training, ergonomic adjustments, or a control group with no intervention.

Participants: A total of 150 office workers were recruited from a tertiary hospital .

Inclusion criteria:

- experiencing chronic neck and/or shoulder pain for at least 3 months
- working at a computer for a minimum of 4 hours per day
- being aged between 25 and 55 years.

Exclusion criteria included:

- previous surgery on the neck or shoulder
- severe comorbid conditions affecting musculoskeletal health
- participation in other concurrent interventions for neck or shoulder pain.

Interventions

1. Postural Training Group: Participants in this group underwent a structured postural training program lasting 12 weeks. The program included:

- **Educational Sessions:** Two 1-hour sessions on proper posture, ergonomics, and exercises.
- **Exercise Regimen:** A combination of stretching, strengthening, and postural correction exercises performed three times a week. Exercises included shoulder shrugs, neck stretches, and upper back strengthening exercises.

2. Ergonomic Adjustments Group: Participants received ergonomic assessments and adjustments to their workstation, including:

- **Adjustable Chairs and Desks:** Recommendations for optimal chair height, desk arrangement, and monitor positioning.
- **Workstation Ergonomics Training:** One 2-hour session on ergonomic principles and adjustments.

3. Control Group: Participants in the control group did not receive any intervention during the study period.

Outcome Measures

Primary and secondary outcome measures were assessed at baseline, post-intervention (12 weeks), and at a 6-month follow-up.

1. Primary Outcomes:

- **Pain Levels:** Assessed using the Visual Analog Scale (VAS), where participants rated their pain intensity from 0 (no pain) to 10 (worst pain imaginable).
- **Functional Disability:** Evaluated using the Neck Disability Index (NDI) and the Shoulder Pain and Disability Index (SPADI), which measure the impact of pain on daily activities and functional limitations.

2. Secondary Outcomes:

- **Postural Alignment:** Measured using photographic analysis and software to assess changes in head, shoulder, and spinal alignment.
- **Quality of Life:** Assessed using the Short Form Health Survey (SF-36) to evaluate overall well-being and impact on daily life.

Data Collection: Data were collected through self-reported questionnaires, physical assessments by trained physiotherapists, and photographic analysis at each assessment point. To ensure reliability, assessments were conducted by a single assessor blinded to the group allocations.

Data Analysis: Quantitative data were analyzed using statistical software (SPSS version 27.0). Between-group comparisons for pain levels, functional disability, and postural alignment were conducted using analysis of variance (ANOVA) and mixed-effects models to account for repeated measures. Pairwise comparisons were performed where appropriate to identify specific group differences. A p-value of <0.05 was considered statistically significant.

Ethical Considerations: The study was approved by the ethics committee. participants provided written informed consent before enrollment. Confidentiality of participant data was maintained throughout the study, and all procedures adhered to ethical guidelines for research involving human subjects.

Findings

Participant Demographics: A total of 150 participants were enrolled in the study, with 50 assigned to each group (postural training, ergonomic adjustments, and control). The demographic characteristics of the participants are summarized in Table 1.

Table 1: Participant Demographics

Characteristic	Postural Training (n=50)	Ergonomic Adjustments (n=50)	Control (n=50)
Age (years)	42.5 ±8.3	43.2 ±9.1	42.8 ±8.7
Gender (Male/Female)	22/28	25/25	23/27
Duration of Pain (months)	14.2 ±6.4	13.8 ±6.1	14.0 ±6.2
Hours Worked Per Day	7.8 ±1.2	7.9 ±1.3	8.0 ±1.1

Primary Outcomes

Pain Levels: Significant differences in pain levels were observed between groups at post-intervention and follow-up. As shown in Table 2, the postural training group reported a significant reduction in pain compared to the ergonomic adjustments and control groups.

Table 2: Pain Levels (VAS) Over Time

Group	Baseline	Post-Intervention	Follow-Up
Postural Training	7.5 ±1.2	4.2 ±1.1	3.8 ±1.0
Ergonomic Adjustments	7.4 ±1.3	5.6 ±1.4	5.3 ±1.3
Control	7.6 ±1.2	7.4 ±1.2	7.5 ±1.1

Functional Disability: The postural training group demonstrated significant improvements in functional disability scores, as indicated by the Neck Disability Index (NDI) and the Shoulder Pain and Disability Index (SPADI), compared to the other groups.

Table 3: Functional Disability Scores

Measure	Group	Baseline	Post-Intervention	Follow-Up
NDI (Score, 0-50)	Postural Training	22.4 ±6.5	14.7 ±5.8	13.2 ±5.5
	Ergonomic Adjustments	22.0 ±6.2	18.9 ±6.0	18.3 ±5.9
	Control	22.5 ±6.3	22.1 ±6.2	22.0 ±6.1
SPADI (Score, 0-100)	Postural Training	42.8 ±11.2	27.4 ±10.5	24.8 ±10.2
	Ergonomic Adjustments	42.2 ±11.5	34.8 ±11.3	33.4 ±11.0
	Control	43.0 ±11.3	42.5 ±11.4	43.0 ±11.2

Secondary Outcomes

Postural Alignment: Significant improvements in postural alignment were observed in the postural training group, as measured by photographic analysis.

Table 4: Postural Alignment Scores

Alignment Parameter	Group	Baseline	Post-Intervention	Follow-Up
Head Position (degrees)	Postural Training	15.2 ±3.4	11.3 ±2.8	10.5 ±2.6
	Ergonomic Adjustments	15.1 ±3.6	13.5 ±3.2	13.2 ±3.1
	Control	15.3 ±3.5	15.1 ±3.3	15.2 ±3.4
Shoulder Position (degrees)	Postural Training	12.8 ±4.2	8.9 ±3.9	8.5 ±3.6
	Ergonomic Adjustments	13.0 ±4.1	11.4 ±4.0	11.2 ±3.8
	Control	12.7 ±4.3	12.8 ±4.2	12.9 ±4.1

Quality of Life: The postural training group reported significant improvements in quality of life, as measured by the Short Form Health Survey (SF-36), compared to the ergonomic adjustments and control groups.

Table 5: Quality of Life Scores (SF-36)

Domain	Group	Baseline	Post-Intervention	Follow-Up
Physical Functioning	Postural Training	58.3 ±12.5	72.5 ±10.8	74.0 ±10.2
	Ergonomic Adjustments	57.9 ±13.0	64.2 ±12.3	65.1 ±12.1
	Control	58.4 ±12.2	58.7 ±12.5	58.5 ±12.4
Role-Physical	Postural Training	49.0 ±18.2	68.2 ±15.5	70.0 ±15.0
	Ergonomic Adjustments	48.8 ±17.8	58.9 ±16.0	59.5 ±15.8
	Control	49.2 ±18.5	49.0 ±18.2	48.8 ±18.4

These findings indicate that postural training has a significant positive impact on reducing neck and shoulder pain, improving functional disability, postural alignment, and quality of life in office workers.

Discussion

Summary of Findings

This study evaluated the long-term effects of postural training on neck and shoulder pain among office workers and compared it with ergonomic adjustments and a control group. The findings indicate that postural training significantly reduced pain levels and functional disability, improved postural alignment, and enhanced quality of life compared to the other groups. The ergonomic adjustments group showed moderate improvements, while the control group exhibited minimal changes.

Effectiveness of Postural Training

The significant reduction in pain and improvement in functional outcomes observed in the postural training group align with previous research suggesting that corrective exercises and educational interventions can effectively manage musculoskeletal pain (Smith et al., 2018). Postural training likely contributes to these

improvements by enhancing awareness of body mechanics and reinforcing proper posture, which can alleviate strain on musculoskeletal structures (Habibi and Soury, 2015).

Comparison with Ergonomic Adjustments

While ergonomic adjustments also resulted in positive changes, the benefits were less pronounced compared to postural training. Ergonomic interventions typically focus on altering the physical workspace to reduce strain (Hoe et al., 2018), but they may not address the behavioral and habitual aspects of poor posture. The additional focus on exercises and posture correction in the postural training program might explain the superior outcomes observed in this group (Mehrparvar et al., 2014).

Control Group Findings

The minimal changes in the control group highlight the challenges associated with managing chronic neck and shoulder pain without structured interventions. This underscores the necessity for targeted therapeutic strategies, as passive or no interventions often fail to produce meaningful improvements (Cosio and Lin, 2018).

Postural Alignment and Quality of Life

Improvements in postural alignment and quality of life observed in the postural training group support the hypothesis that better postural habits contribute to overall well-being (Gasparotto et al., 2016). The significant improvements in the SF-36 scores for the postural training group further emphasize the holistic benefits of this intervention, affecting both physical and mental health aspects (Gasparotto et al., 2016).

Limitations

This study has several limitations. Firstly, the study's duration, although adequate, may not capture the very long-term effects of postural training. Future research should consider extended follow-up periods to assess the durability of the benefits. Secondly, the study relied on self-reported measures for pain and functional disability, which could introduce bias. Objective measures such as motion analysis or direct observation of posture might provide additional insights.

Implications for Practice

The results suggest that incorporating postural training into workplace wellness programs could be beneficial for reducing neck and shoulder pain among office workers. Organizations should consider integrating regular postural training sessions and education into their occupational health strategies to enhance employee well-being and productivity.

Conclusion

Postural training proves to be an effective intervention for managing neck and shoulder pain among office workers, demonstrating superior outcomes compared to ergonomic adjustments and no intervention. Future studies should explore the long-term sustainability of these benefits and consider additional objective measures to further validate the effectiveness of postural training programs.

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