

Original Article

# Effects of a Home-Based Exercise Programme on Shoulder Pain and Functional Status in Garment Workers

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## ABSTRACT

**Background:** Work-related musculoskeletal disorders, particularly shoulder pain, are a prevalent concern among garment workers, who often engage in repetitive and manual tasks. Previous research has indicated a high incidence of shoulder pain in this population, with a need for effective interventions to mitigate these issues.

**Objective:** The objective of this study was to evaluate the efficacy of a home-based exercise program in reducing shoulder pain and improving functional status among garment workers.

**Methods:** This experimental study involved 60 male and female tailors with work-related shoulder pain, randomly divided into an intervention and a control group (30 participants each). Participants were selected based on specific criteria, including experiencing pain in the glenohumeral joint area and showing at least two positive signs of shoulder impingement. Exclusion criteria included a history of rotator cuff surgery, shoulder dislocation, or pain only in the neck or shoulder blade. The intervention group underwent a four-week home-based exercise program, including stretching and strengthening exercises targeting the pectoralis minor muscle, upper trapezius, serratus anterior, and external shoulder rotation. The Shoulder Rating Questionnaire (SRQ) was used for pre- and post-intervention assessments.

**Results:** Post-intervention, the intervention group showed a significant increase in the SRQ score from 62.6 ( $\pm 1.99$ ) to 77.0 ( $\pm 2.54$ ) ( $p = 0.016$ ), a reduction in work-related pain from 4.9 ( $\pm 0.51$ ) to 2.4 ( $\pm 0.31$ ) ( $p = 0.041$ ), and a decrease in work-related disability from 4.3 ( $\pm 0.40$ ) to 2.6 ( $\pm 0.46$ ) ( $p = 0.032$ ). The satisfaction score also significantly improved from 4.1 ( $\pm 0.43$ ) to 6.5 ( $\pm 0.22$ ) ( $p = 0.003$ ). In contrast, the control group did not exhibit any significant changes in these measures.

**Conclusion:** The study demonstrates that a structured home-based exercise program can significantly reduce shoulder pain and improve functional status among garment workers. This suggests the potential for such interventions to be integrated into occupational health strategies, particularly in sectors prone to work-related musculoskeletal disorders.

**Keywords:** Shoulder Pain, Garment Workers, Home-Based Exercise, Musculoskeletal Disorders, Occupational Health, Exercise Program.

## INTRODUCTION

The shoulder joint, as the most active joint in the body, plays a crucial role in various functional activities. However, its extensive range of motion makes it vulnerable to a myriad of disorders, significantly impacting its function and leading to conditions such as pain and stiffness. This susceptibility is particularly noteworthy among teachers, where shoulder pain is a prevalent concern, often prompting early retirement. This trend is evident across both developing and underdeveloped countries, positioning musculoskeletal disorders as leading contributors to physical and occupational disabilities (1).

Characterized as a ball-and-socket joint, the shoulder comprises the humerus, clavicle, and scapula, with surrounding cartilage providing a protective layer. It consists of two primary joints: the acromio-clavicular and gleno-humeral joints (3). The joint is formed by the connection between the head of the humerus and the glenoid surface of the scapula (4). Pain in the shoulder can arise not only from mechanical issues but also from systemic diseases affecting organs like the heart, gall bladder, or liver (2).

Occupational settings often expose individuals to risk factors such as working in awkward positions, engaging in activities with hands elevated above shoulder level, and performing heavy lifting (5). The exact threshold for the elevation of arms and the duration that leads to detrimental effects remains uncertain (6). Moreover, various risk factors contribute to musculoskeletal issues, including demographic aspects like gender and age, personal characteristics such as height and smoking habits, and work-related factors like working hours, computer skills, and inadequate rest intervals (7).

In the context of low and middle-income countries (LMICs), informal employment constitutes a significant part of the workforce, yet research on its health impacts is limited. Studies have shown that the relationship between work and health is complex, encompassing both physical and psychosocial aspects, and influencing health trends at individual and population levels (8-10). Approximately two billion workers globally are engaged in informal employment, often without adequate occupational health and safety (OHS) regulations, which may lead to adverse health outcomes (11). Research in LMICs indicates that informal workers report poorer health status (12, 13) and quality of life (14) compared to formal workers and are at a higher risk of mental illnesses (13, 15). These workers often face unfavorable working conditions, inconsistent incomes, healthcare access challenges, and are more vulnerable to severe health crises (16–18).

Home-based garment workers (HBGWs) in LMICs, who are either self-employed or subcontracted, often work in domestic settings, producing textiles and crafts. They face unique challenges related to their occupational exposures, which could interact with other factors in causing shoulder pain (19-22). In treating shoulder pain conservatively, stretching and strengthening programs are commonly used to alleviate symptoms and address abnormalities in motion and muscle activity (23-24).

## MATERIAL AND METHODS

In this experimental study, the effects of a home-based exercise program on shoulder pain and functional status were investigated among tailors engaged in regular clothing stitching. A total of 60 male and female tailors, who volunteered and met the clinical criteria, were selected for the study. Participants were divided into two groups of 30 each through a randomized selection process. This process involved an investigator blindly choosing from two papers, each indicating a different group assignment, prior to the baseline measurements.

Eligibility for the study required individuals to experience shoulder pain specifically in the area of the glenohumeral joint, excluding pain in the neck or shoulder blade but including referred pain from the rotator cuff above the deltoid muscle attachment. Participants also had to exhibit at least two positive signs of shoulder impingement and pain during two out of three clinical tests. These tests included: (a) experiencing a painful arc while lifting the arm in the plane of the shoulder blade; (b) tenderness upon palpation of the biceps or rotator cuff muscles; and (c) pain during resisted shoulder joint movements such as flexion, abduction, internal rotation, or external rotation, particularly when the arm was elevated to 90° or positioned at the side for rotations (16).

Exclusion criteria encompassed a history of rotator cuff surgery, shoulder dislocation or injury from trauma, pain solely in the shoulder blade or neck upon arm elevation, or shoulder pain resulting from neck issues. Two licensed physical therapists conducted the pre-study evaluations to ensure participants met these criteria. The diagnosis of shoulder impingement was based on a comprehensive clinical examination that included multiple positive signs, such as impingement tests, painful arc, and pain with resisted motion.

Participants were required to complete the Shoulder Rating Questionnaire (SRQ) for baseline and outcome measurements, self-reporting their responses according to standardized instructions. Each participant received written and pictorial instructions for the exercise program, along with a daily log for adherence tracking. The intervention group underwent a one-week review session with a therapist to address any queries related to the exercises.

The exercise regimen, conducted over four weeks, comprised two stretching exercises performed five times daily for 30 seconds each. The first targeted the pectoralis minor muscle, involving leaning into a corner with hands at shoulder level, and the second focused on the posterior shoulder, reached across the chest to the opposite shoulder blade. Additionally, an upper trapezius muscle relaxation exercise was performed five times daily, emphasizing shoulder relaxation during arm elevation.

Strength training exercises included the serratus anterior muscle and external shoulder rotation, conducted three times weekly. The serratus anterior exercise involved lying on the back and lifting a weight by pushing the shoulder blade forward. The external rotation exercise used a Thera-Band (blue level), with participants resisting outward shoulder rotation. Initially, three sets of 10 repetitions were performed, increasing to 15 and then 20 repetitions over the subsequent weeks, with adjustments in weight or band tension as necessary.

Data analysis was conducted using SPSS version 23, with the SRQ scores, ranging from 17 to 100, evaluated using a t-test at a significance level of 0.05 (19). Higher SRQ scores indicated better shoulder function and fewer problems.

## RESULTS

Table 1 presents the pre- and post-intervention scores for the intervention group, along with the corresponding p-values. The results indicate statistically significant changes in several variables. SRQ Score: The pre-intervention SRQ score was 62.6 ( $\pm 1.99$ ), and it increased significantly to 77.0 ( $\pm 2.54$ ) post-intervention ( $p = 0.016$ ). Satisfaction Score: The pre-intervention satisfaction score was 4.1 ( $\pm 0.43$ ), and it showed a significant improvement to 6.5 ( $\pm 0.22$ ) post-intervention ( $p = 0.003$ ). Work-Related Pain: The pre-intervention work-related pain score was 4.9 ( $\pm 0.51$ ), and it decreased significantly to 2.4 ( $\pm 0.31$ ) post-intervention ( $p = 0.041$ ). Work-Related Disability: The pre-intervention work-related disability score was 4.3 ( $\pm 0.40$ ), and it reduced significantly to 2.6 ( $\pm 0.46$ ) post-intervention ( $p = 0.032$ ).

**Table 1. Pre and post score of intervention group.**

| Variables               | Pre score Mean(SD) | Post score Mean(SD) | p-value |
|-------------------------|--------------------|---------------------|---------|
| SRQ score               | 62.6 $\pm$ 1.99    | 77.0 $\pm$ 2.54     | 0.016   |
| Satisfaction score      | 4.1 $\pm$ 0.43     | 6.5 $\pm$ 0.22      | 0.003   |
| Work related pain       | 4.9 $\pm$ 0.51     | 2.4 $\pm$ 0.31      | 0.041   |
| Work related disability | 4.3 $\pm$ 0.40     | 2.6 $\pm$ 0.46      | 0.032   |

In contrast, Table 2 displays the pre and post-intervention scores for the control group, along with the associated p-values. Notably, there were no statistically significant changes observed in any of the variables for the control group. SRQ Score: The pre-intervention SRQ score was 71.5 ( $\pm 2.43$ ), and it did not significantly change, remaining at 70.1 ( $\pm 2.77$ ) post-intervention ( $p = 0.781$ ). Satisfaction Score: The pre-intervention satisfaction score was 5.1 ( $\pm 0.71$ ), and it remained relatively stable at 5.0 ( $\pm 0.68$ ) post-intervention ( $p = 0.223$ ). Work-Related Pain: The pre-intervention work-related pain score was 4.5 ( $\pm 0.35$ ), and there was no significant change, with the post-intervention score at 4.3 ( $\pm 0.29$ ) ( $p = 0.401$ ). Work-Related Disability: The pre-intervention work-related disability score was 3.6 ( $\pm 0.41$ ), and it also showed no significant change, with the post-intervention score at 3.8 ( $\pm 0.48$ ) ( $p = 0.081$ ).

**Table 2. Pre and post score of control group.**

| Variables               | Pre score Mean(SD) | Post score Mean(SD) | p-value |
|-------------------------|--------------------|---------------------|---------|
| SRQ score               | 71.50 $\pm$ 2.43   | 70.18 $\pm$ 2.77    | 0.781   |
| Satisfaction score      | 5.12 $\pm$ 0.71    | 5.31 $\pm$ 0.68     | 0.223   |
| Work related pain       | 4.50 $\pm$ 0.35    | 4.45 $\pm$ 0.29     | 0.401   |
| Work related disability | 3.6 $\pm$ 0.41     | 3.80 $\pm$ 0.48     | 0.081   |

These results suggest that the intervention had a positive impact on the variables assessed in the intervention group, while the control group did not show significant changes in these measures over the same time frame.

## DISCUSSION

In this discussion, the focus is on the relationship between work-related shoulder pain (SP) and its associated risk factors, particularly in the context of informal garment workers. The cross-sectional study under review reported a six-month prevalence of SP at 46.9% among participants, highlighting a significant health concern in this occupational sector. Notably, the garment industry, characterized by manual and repetitive tasks, presents an elevated risk for work-related musculoskeletal disorders (wMSDs). Among various roles within this sector, sewing, packing, and ironing workers reported SP rates of 40%, 46.15%, and 27.5%, respectively. These findings underscore the critical role of occupational factors such as awkward postures, prolonged standing, and uncomfortable movements in the development of musculoskeletal disorders (MSDs) among garment workers (25, 26).

The intervention group in the current study demonstrated a noteworthy improvement in their SRQ scores, increasing from 62.6 pre-intervention to 77.0 post-intervention ( $p = 0.016$ ). This significant change suggests that the intervention positively impacted the mental well-being of the participants, as indicated by the reduced SRQ scores. Furthermore, the intervention group exhibited a decrease in work-related pain and disability scores ( $p$ -values of 0.041 and 0.032, respectively), indicating an effective reduction in work-related pain and an enhancement in physical well-being (27).

Research focusing on self-reported neck and shoulder pain revealed a significant 72% reduction in pain intensity within the first month, followed by a gradual increase of 4% per month from the first to the fourth month. This pattern suggests a complex relationship between perceived physical workload, overtime work, and the trajectory of pain reduction (27).

The study's findings are consistent with the broader literature advocating exercise therapy as a successful intervention for managing subacromial shoulder pain. However, further research is needed to establish detailed guidelines on the specifics of such exercise interventions, including their type, dosage, duration, and expected outcomes, as well as the potential benefits of integrating manual therapy in early treatment stages (28).

Additionally, the significant improvement in the satisfaction score in the intervention group, from 4.1 to 6.5 ( $p = 0.003$ ), implies increased job satisfaction among participants following the intervention. This aligns with findings from a randomized controlled trial examining sling exercise therapy (SET) in stroke patients, which showed significant improvements in balance, upper limb motor function, functional independence, and reductions in shoulder pain. SET was particularly effective in enhancing balance ability, upper limb motor function, and alleviating shoulder pain compared to routine training (29).

Finally, the role of progressive resistance exercise in addressing nontraumatic rotator cuff-related shoulder pain (RCRSP) is highlighted. While resistance exercise is effective in improving mechanical aspects of the shoulder, it's crucial to understand that the strength gains are often modest and may not have substantial clinical implications. This perspective emphasizes the need to consider broader biological mechanisms in managing RCRSP and to extend the clinical message beyond simply attributing shoulder pain to weakness or deconditioning (30).

## CONCLUSION

In conclusion, this study demonstrates the significant impact of a targeted home-based exercise program on reducing shoulder pain and improving functional status among garment workers, a group particularly vulnerable to work-related musculoskeletal disorders. The marked improvements in Shoulder Rating Questionnaire scores, reductions in work-related pain and disability, and increased satisfaction scores in the intervention group underscore the efficacy of such exercise regimens. These findings have important implications for occupational health, particularly in the informal sector, highlighting the necessity of incorporating structured exercise programs into workplace health initiatives. They also emphasize the need for further research to refine exercise protocols and explore their integration with other therapeutic approaches, thereby contributing to a broader strategy for managing and preventing shoulder-related disorders in high-risk occupational groups.

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