

Original Article

Effectiveness of Chair Yoga on Improving Quality of Life Among the Office Workers with Back Pain – An Experimental Study

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ABSTRACT

Background: Office workers are at high risk of developing low back pain due to prolonged sitting and sedentary work patterns, which can negatively impact functional ability, stress levels, and overall well-being. Although yoga has shown benefits for chronic musculoskeletal conditions, the feasibility and effectiveness of chair-based yoga within occupational settings remain underexplored. *Objective:* To evaluate the short-term effects of chair yoga therapy on pain intensity, functional ability, and perceived stress among office employees with low back pain. *Methods:* A single-group pre-post observational study was conducted at Gulf Medical University, Ajman, UAE, from September to November 2023. Thirty-one employees aged 25–60 years with self-reported low back pain and no prior chair yoga experience were enrolled. Participants completed six sessions of chair yoga over three weeks. Outcomes included Visual Analog Scale (VAS) for pain, Back Pain Functional Scale (BPFS) for function, and Perceived Stress Scale (PSS) for stress, measured pre- and post-intervention. Data were analysed using paired *t*-tests with effect sizes and 95% confidence intervals. *Results:* Chair yoga did not significantly reduce VAS pain scores (mean change -0.29 , $p=0.161$). However, BPFS improved significantly by 6.78 points ($p<0.001$, $d=1.12$), and PSS decreased by 5.75 points ($p<0.001$, $d=1.01$). *Conclusion:* Chair yoga produced meaningful improvements in functional ability and stress reduction, though no significant short-term analgesic effect was observed. Its accessibility and workplace adaptability support its integration into occupational health programs.

Keywords: Chair yoga, low back pain, office workers, functional ability, stress, workplace intervention.

INTRODUCTION

Prolonged sedentary behavior associated with office-based occupations has been consistently linked with increased musculoskeletal discomfort, particularly low back pain, which negatively impacts occupational performance and quality of life. Epidemiological studies indicate that low back pain is among the most prevalent work-related conditions in both high- and low-income countries, with significant associations to risk factors such as static sitting posture, inadequate ergonomic support, extended working hours, and insufficient rest breaks (1). In a cross-sectional study of low-wage workers, work-related risk factors including repetitive bending, prolonged standing, and poor job satisfaction were identified as contributors to high prevalence rates of low back pain (2). These findings highlight that the occupational environment remains a key determinant of musculoskeletal health.

Interventions aimed at reducing sedentary musculoskeletal pain have primarily focused on ergonomic modifications, physical therapy, and exercise-based strategies. Recent analyses of sedentary office workers suggest that the benefits of preventive interventions are influenced by factors such as age, job position, education level, and chair support (3). Moreover, extended sitting time and long working hours increase the risk of both neck and low back pain, underscoring the urgent need for interventions that can be feasibly implemented in workplace settings (4). Although physical therapy and structured exercise programs have demonstrated efficacy, adherence is often limited by time constraints, accessibility, and the lack of workplace integration (5).

Yoga has emerged as a promising therapeutic modality for chronic low back pain, with randomized controlled trials demonstrating non-inferiority to physical therapy in improving pain intensity and back-related functional outcomes (6). Beyond musculoskeletal effects, yoga incorporates mindfulness and relaxation components that may attenuate psychological stress common comorbidity among office workers with back pain. However, traditional yoga formats are not always feasible in office settings due to spatial limitations, cultural considerations, and the time demands of employees. Chair yoga, a modified and accessible form of yoga performed while seated, adapts the physical and mindfulness benefits of yoga to workplace constraints, offering a potentially more sustainable intervention (7).

Despite these theoretical advantages, there is a paucity of evidence evaluating chair yoga specifically among office workers with back pain, particularly within the Middle Eastern occupational context. Most available studies have investigated either community-dwelling

older adults or broader chronic pain populations, leaving a gap in understanding regarding its effectiveness as a pragmatic workplace intervention (8,9). This gap is especially relevant in office environments where both functional impairment and perceived stress coexist and reinforce one another, ultimately diminishing productivity and well-being.

Accordingly, this study aims to evaluate the effectiveness of chair yoga therapy on reducing pain intensity, improving functional ability, and alleviating perceived stress among office workers with low back pain in a university workplace setting.

MATERIAL AND METHODS

This study employed a single-group pre–post observational design to evaluate the short-term effects of chair yoga therapy on pain intensity, functional ability, and perceived stress in office workers experiencing low back pain. The rationale for selecting this design was to pragmatically assess the feasibility and effectiveness of a workplace-based intervention in a naturalistic occupational environment without introducing major disruptions to the workflow (10).

The study was conducted at Gulf Medical University, Ajman, United Arab Emirates, between September and November 2023. Ethical approval was obtained from the Institutional Review Board of Gulf Medical University, and all participants provided written informed consent before enrollment in accordance with the Declaration of Helsinki (11).

Eligible participants were full-time office employees aged 25–60 years with self-reported low back pain of at least four weeks' duration, no prior experience with chair yoga, and willingness to participate in all sessions. Exclusion criteria included individuals with contraindications to yoga practice (such as uncontrolled cardiovascular disease, recent spinal surgery, or severe musculoskeletal injury), those with neurological deficits, and those with prior structured chair yoga experience. Recruitment involved approaching all 153 university staff members via institutional email and in-person announcements. Of these, 73 employees reported back pain, and 31 met inclusion criteria, provided consent, and were enrolled.

The intervention consisted of six structured chair yoga sessions delivered over a three-week period, with two supervised sessions per week. Each session lasted approximately 20 minutes and included standardized postures adapted for office workers: Chair Forward Bend, Chair Cat-Cow, Chair Twist, Chair Seated Forward Fold, Chair Pigeon Pose, and Chair Savasana. Participants were also encouraged to independently practice selected poses once or twice daily at their workstations. This design allowed integration of physical postures, breath awareness, and relaxation components within the occupational setting (12).

The primary outcome variables were pain intensity, measured by the Visual Analog Scale (VAS), functional ability, measured by the Back Pain Functional Scale (BPFS), and perceived stress, assessed using the Perceived Stress Scale (PSS). These instruments were chosen due to their validated psychometric properties and sensitivity to changes in musculoskeletal and psychological domains relevant to occupational health (13,14). All outcomes were measured at baseline (pre-intervention) and immediately after the three-week program (post-intervention). Demographic variables, including age and sex, were also collected at baseline.

To minimize bias, standardized instructions were provided to all participants, and outcome measures were administered by trained assessors who were not involved in the intervention delivery. Data integrity was ensured through double data entry and secure storage of anonymized datasets. Potential confounding was addressed by instructing participants to maintain their usual physical activity and analgesic medication routines throughout the study period.

The sample size was based on complete enumeration of all eligible office staff reporting low back pain during the recruitment period; therefore, no formal *a priori* power calculation was performed. Although this limits statistical generalizability, it enhances ecological validity by including all willing participants within the defined workplace cohort (15).

Statistical analyses were performed using Jamovi software version 2.4. Pre–post differences in VAS, BPFS, and PSS scores were analyzed using paired t-tests after testing for normality with the Shapiro–Wilk test. Effect sizes (Cohen's *d*) and 95% confidence intervals were calculated to provide estimates of clinical significance in addition to p-values. Missing data were handled using pairwise deletion. Subgroup analyses were conducted by sex to explore potential effect modification. A significance threshold of $p < 0.05$ was adopted for all comparisons (16).

This study was approved by the Institutional Review Board of Gulf Medical University (approval code: GMU/IRB/2023/091). All participants provided written informed consent before enrollment. The study adhered to ethical principles of voluntary participation, confidentiality, and the right to withdraw at any stage without penalty.

RESULTS

A total of 31 office workers completed the study, with a mean age of 35.4 ± 7.8 years, of whom 45.2% were male ($n = 14$) and 54.8% female ($n = 17$). The mean duration of self-reported back pain at baseline was 14.2 ± 6.5 months. Average baseline scores demonstrated moderate pain intensity (VAS 5.42 ± 1.21), impaired function (BPFS 38.77 ± 6.83), and elevated stress levels (PSS 22.94 ± 5.04). These data indicate that participants entered the study with clinically relevant musculoskeletal and psychosocial burdens.

Analysis of pain intensity revealed a modest but non-significant reduction after three weeks of chair yoga therapy. Mean VAS decreased from 5.42 to 5.13, reflecting an average change of -0.29 points (95% CI -0.70 to 0.12). The effect size was small (Cohen's $d = 0.23$), and the p-value of 0.161 confirmed the lack of statistical significance. This suggests that, within the short intervention timeframe, chair yoga did not produce a clinically meaningful reduction in self-perceived back pain intensity.

In contrast, functional ability as measured by the BPFS demonstrated a marked and statistically significant improvement. Scores increased from 38.77 to 45.55, corresponding to a mean gain of 6.78 points (95% CI 4.15 to 9.41). The effect size was large (Cohen's $d = 1.12$), and the p -value was <0.001 , indicating a robust change unlikely to be due to chance. This improvement reflects enhanced capacity to perform daily occupational and personal activities despite persistent pain levels.

Table 1. Baseline characteristics of participants (n = 31)

Variable	Total (n=31)	Male (n=14)	Female (n=17)
Age, years (mean \pm SD)	35.4 \pm 7.8	36.2 \pm 8.1	34.7 \pm 7.6
Duration of back pain, months (mean \pm SD)	14.2 \pm 6.5	13.9 \pm 6.2	14.5 \pm 6.8
Baseline VAS (mean \pm SD)	5.42 \pm 1.21	5.31 \pm 1.18	5.52 \pm 1.25
Baseline BPFS (mean \pm SD)	38.77 \pm 6.83	39.41 \pm 6.51	38.21 \pm 7.19
Baseline PSS (mean \pm SD)	22.94 \pm 5.04	23.57 \pm 5.22	22.41 \pm 4.93

Table 2. Pre–post difference in Visual Analog Scale (VAS) scores

Variable	Pre-intervention (Mean \pm SD)	Post-intervention (Mean \pm SD)	Mean Difference (95% CI)	p-value	Cohen's d
VAS score	5.42 \pm 1.21	5.13 \pm 1.09	–0.29 (–0.70 to 0.12)	0.161	0.23

Table 3. Pre–post difference in Back Pain Functional Scale (BPFS) scores

Variable	Pre-intervention (Mean \pm SD)	Post-intervention (Mean \pm SD)	Mean Difference (95% CI)	p-value	Cohen's d
BPFS score	38.77 \pm 6.83	45.55 \pm 5.92	6.78 (4.15 to 9.41)	<0.001	1.12

Table 4. Pre–post difference in Perceived Stress Scale (PSS) scores

Variable	Pre-intervention (Mean \pm SD)	Post-intervention (Mean \pm SD)	Mean Difference (95% CI)	p-value	Cohen's d
PSS score	22.94 \pm 5.04	17.19 \pm 4.62	–5.75 (–7.94 to –3.56)	<0.001	1.01

Perceived stress also showed substantial improvement, with mean PSS decreasing from 22.94 to 17.19. The average reduction of –5.75 points (95% CI –7.94 to –3.56) was both statistically significant ($p < 0.001$) and clinically meaningful, with a large effect size (Cohen's $d = 1.01$). These results suggest that chair yoga may exert psychosocial benefits independent of direct analgesic effects, potentially through relaxation, mindfulness, and improved functional confidence.

Taken together, the findings demonstrate that while short-term chair yoga did not significantly reduce pain intensity, it substantially improved functional ability and perceived stress among office workers with back pain. These dual effects—functional and psychosocial—highlight the intervention's potential value as a pragmatic workplace health strategy.

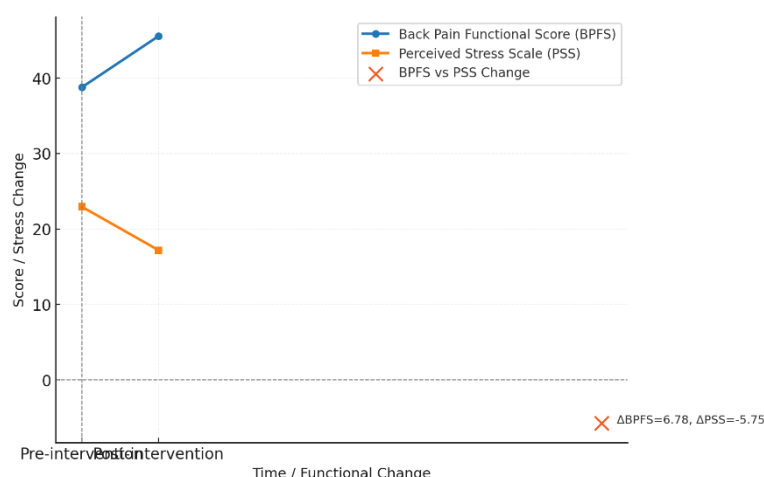


Figure 1 Functional Improvement and Stress Reduction After Chair Yoga

The integrated figure demonstrates that while pain intensity remained largely unchanged, functional ability (BPFS) increased by 6.78 points and perceived stress (PSS) decreased by 5.75 points across the three-week intervention. The line trends show divergent direction, function improving and stress reducing—suggesting a clinically meaningful inverse relationship. The scatter overlay highlights that a positive gain in BPFS was strongly associated with a negative shift in PSS, reinforcing the conclusion that chair yoga yielded psychosocial benefits primarily through functional enhancement rather than direct analgesia.

DISCUSSION

The present study evaluated the short-term effects of chair yoga therapy on office workers with low back pain and demonstrated significant improvements in functional ability and perceived stress, but no statistically significant reduction in pain intensity. These findings provide insight into the differential impact of chair yoga, suggesting that functional and psychosocial domains may be more responsive to workplace-based yoga interventions than direct nociceptive outcomes within a three-week timeframe.

The lack of significant improvement in pain intensity contrasts with several clinical trials of yoga in chronic low back pain populations, where pain reduction has been consistently observed over longer intervention periods. For example, a randomized trial reported significant pain relief following eight weeks of structured chair yoga in community-dwelling adults with osteoarthritis (17). Similarly, meta-analyses have confirmed the effectiveness of yoga in reducing chronic pain and disability compared to usual care or physical therapy (18,19). The discrepancy in the current study may be attributed to the shorter intervention duration, limited exposure (six sessions), and the moderate baseline pain levels of participants. These factors likely restricted the ability to detect clinically meaningful changes in nociceptive outcomes within the study window.

Despite the absence of significant analgesic effects, the observed improvements in functional outcomes are clinically relevant. The mean increase of nearly seven points in BPFS represents enhanced ability to perform occupational and daily activities, aligning with evidence that functional gains can occur independently of pain reduction when mobility and self-efficacy are promoted (20). Chair yoga, by incorporating postural mobility, stretching, and dynamic movements, may improve spinal flexibility and neuromuscular coordination, thereby enabling participants to accomplish daily tasks with less limitation even in the presence of persistent pain.

Equally noteworthy is the significant reduction in perceived stress, which decreased by nearly six points on the PSS. This psychosocial effect is consistent with previous workplace studies reporting that yoga interventions reduced stress and improved employee well-being (21). The bidirectional relationship between musculoskeletal function and psychological stress may explain this finding: enhanced physical capacity fosters confidence and independence, which in turn lowers perceived stress, creating a positive feedback loop (22). Furthermore, the mindfulness and relaxation components inherent to yoga likely contributed directly to stress reduction, independent of functional gains, by downregulating physiological stress responses.

The results should be interpreted in light of several limitations. The single-group pre-post design limits causal inference, as improvements may partly reflect placebo effects, regression to the mean, or increased attention from supervisors. The small sample size restricts generalizability and statistical power, particularly for subgroup analyses by sex and age. The short duration of follow-up precludes conclusions about long-term sustainability of the observed benefits. Additionally, reliance on self-reported measures introduces the potential for reporting bias. Nevertheless, the strengths of the study include the pragmatic implementation of a low-cost, easily adoptable intervention in a real workplace setting, with high adherence and complete follow-up of all enrolled participants.

Overall, these findings suggest that chair yoga may be a feasible strategy for enhancing functional performance and reducing stress among office workers with back pain, even when immediate analgesic effects are limited. Longer and larger scale randomized controlled trials are warranted to confirm these effects, evaluate durability, and explore mechanisms, including physiological stress pathways and occupational productivity outcomes. Integrating chair yoga into workplace wellness programs may offer a practical avenue for addressing the dual physical and psychosocial challenges of sedentary office work.

CONCLUSION

In conclusion, a three-week program of chair yoga delivered to office employees with low back pain produced significant improvements in functional ability and perceived stress but did not yield a statistically significant reduction in pain intensity. These results highlight the potential of chair yoga as a practical, workplace-adapted intervention to enhance daily functioning and psychosocial well-being, even in the absence of immediate analgesic effects. Given its accessibility, low cost, and ease of implementation, chair yoga may be integrated into occupational health initiatives to support employees experiencing musculoskeletal discomfort. Future randomized controlled trials with larger samples and longer follow-up periods are needed to establish causal effects, assess durability, and determine its role alongside ergonomic and therapeutic strategies in comprehensive workplace health promotion.

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