



Effect of a Six-Week Fit Yoga Protocol on Selected Physical Fitness Variables of Indian Corporate Employees: A Randomized Controlled Trial

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Abstract:

Background: The sedentary nature of corporate work in India, especially in the information-technology and e-commerce sectors, has raised concern about declining physical fitness among young working adults. Yoga offers an accessible, low-cost way of addressing several fitness components within the working day. **Objectives:** The study examined whether a structured six-week Fit Yoga Protocol, framed within the spirit of the Fit India Movement, could improve flexibility, muscular endurance, static balance and muscular strength in corporate employees, and whether these effects varied by gender. **Methods:** Forty employees aged 18 to 35 years from several Indian companies were randomly assigned to an experimental group that practised the protocol on five days each week or to a control group that continued its usual routine. Flexibility (V Sit and Reach), muscular endurance (push-ups), static balance (Vrikshasana hold) and muscular strength (Naukasana hold) were assessed before and after the intervention. A 2×2 (Group × Gender) factorial analysis of covariance was applied, with pre-test scores as covariates and significance set at $p < .05$. **Results:** The yoga group recorded significantly higher adjusted means for flexibility ($F = 12.56$, $p = .001$), static balance ($F = 12.72$, $p = .001$) and muscular strength ($F = 14.87$, $p < .001$), whereas muscular endurance did not differ significantly ($F = 2.44$, $p = .127$). Gender and the Group × Gender interaction were non-significant throughout. **Conclusion:** A short, low-cost Fit Yoga Protocol can meaningfully enhance flexibility, balance and core strength among corporate employees of both sexes, supporting its use in workplace wellness programmes.

Keywords: Fit Yoga Protocol, workplace wellness, flexibility, static balance, muscular strength, factorial ANCOVA



Introduction

Work in India's corporate sector, and particularly in its fast-growing information-technology and e-commerce industries, keeps most employees seated for long stretches of the day in front of screens. Long commutes, irregular meal timings, night shifts and mounting deadlines leave little room for planned physical activity. Over time this pattern of prolonged sitting is associated with reduced flexibility, weaker postural muscles, poor balance and a higher risk of non-communicable diseases such as obesity, type 2 diabetes and cardiovascular disorders (Owen et al., 2010). National estimates suggest that only a small share of Indian adults reach the levels of physical activity recommended for health, which makes the working-age population an obvious target for preventive intervention (Mohanty & Ganesh, 2024).

Physical fitness is usually described through several distinct components, among which flexibility, muscular strength, muscular endurance and balance are central to everyday functioning and to the prevention of musculoskeletal complaints. Yoga offers a practical way of addressing these components together. Because it requires no equipment, little space and can be practised within the working day, it fits the constraints of a busy office setting well. Earlier work has shown that regular yoga practice can raise muscular strength, joint mobility and cardiorespiratory efficiency (Tran et al., 2001; Woodyard, 2011), and reviews comparing yoga with conventional exercise report that it is often as effective, and occasionally more effective, than standard training for a range of health outcomes (Ross & Thomas, 2010). Studies conducted with Indian workforces have further indicated that workplace yoga is a feasible and cost-effective wellness measure (Biman et al., 2021).

The four components chosen for this study are the ones most directly affected by a desk-bound routine. Flexibility declines when the hip flexors and hamstrings stay shortened through hours of sitting, and reduced flexibility is closely tied to low back discomfort, one of the most common complaints among office staff. Static balance and postural control weaken when the stabilising muscles are seldom challenged, while core and back strength are needed to hold an upright, healthy posture through a working day. Muscular endurance underlies the ability to sustain repeated effort without early fatigue. Beyond the mechanical benefits, yoga is thought to act on the nervous and endocrine systems, calming the sympathetic response and moderating the activity of the hypothalamic-pituitary-adrenal axis, which may add a recovery-related value on top of the fitness gains (Ross & Thomas, 2010; Woodyard, 2011). Together these features make the four components a sensible and practical focus for a workplace trial.

The Fit India Movement, launched by the Government of India in 2019, encourages citizens to weave physical activity into daily life and to move towards the activity levels recommended by the World Health Organization (Bull et al., 2020; Mohanty & Ganesh, 2024). Building on this idea, the present study designed a compact yoga-based routine, referred to here as the Fit Yoga Protocol, and tested it on corporate employees. Although several trials have looked at yoga in clinical or student groups, comparatively few have examined a brief, structured protocol across four physical fitness components in Indian corporate employees while also checking whether men



and women respond differently. The study therefore had two aims: to compare the adjusted post-test scores of the yoga and control groups on flexibility, muscular endurance, static balance and muscular strength, and to test whether gender or the interaction between gender and the intervention influenced these outcomes. It was hypothesised that the protocol would produce no significant change relative to the control condition, and that gender and the Group $\times$ Gender interaction would exert no significant effect; these null hypotheses were examined at the .05 level of significance.

Materials and Methods

Research Design

A two-group, pre-test and post-test randomized controlled design was adopted. Participants were assessed on all four variables before the programme began and again after six weeks. The design followed a 2 $\times$ 2 factorial structure, with group (yoga versus control) and gender (male versus female) as the two factors, so that the influence of the intervention could be separated from any effect of gender.

Participants

Forty employees between 18 and 35 years of age were selected from several Indian companies, including firms in the information-technology and e-commerce space. Participants were recruited through random sampling and were then randomly allocated to the experimental group or the control group, with an equal number in each. To be included, an individual had to be within the stated age range, free of any severe medical condition or injury that would prevent exercise, willing to complete the six-week programme and prepared to give informed consent along with the data required for analysis. Those who did not meet these conditions were not enrolled. The experimental group followed the Fit Yoga Protocol, while the control group carried on with its normal daily routine and received no structured training during the study period.

Measures

Four field tests were used, each targeting one fitness component. Flexibility was assessed with the V Sit and Reach test, in which the participant sat with legs extended and reached forward along a marked line; the best of three attempts, recorded in centimetres, was retained. Muscular endurance was measured through the maximum number of push-ups performed to fatigue, using the standard form for men and the knee-supported form for women. Static balance was assessed by the hold time of Vrikshasana (tree pose), timed in seconds until the posture could no longer be maintained. Muscular strength of the core and back was assessed by the hold time of Naukasana (boat pose), also recorded in seconds. All tests were carried out indoors in a well-ventilated space, with mats and supervision to ensure safety, and were preceded by a demonstration so that participants understood the correct technique.

The Fit Yoga Protocol

The intervention ran for six weeks, with sessions on five days of the week and two days kept for rest and recovery. Each session opened with one minute of prayer to settle the mind, followed by two minutes of Kapalabhati (two rounds of thirty strokes) and two rounds of Surya Namaskar



to warm the body. The central block of about seven minutes moved through a sequence of asanas covering standing, sitting, prone and supine positions. These included Tadasana and Katichakrasana for posture and spinal mobility, Ushtrasana, Sasakasana and Vakrasana in sitting, Dhanurasana and Makarasana in the prone position, and Viparita Karani, Halasana, Saral Matsyasana and Shavasana in the supine position. The practice closed with about two minutes of Anuloma-Viloma pranayama and one minute of breath-awareness meditation. To allow gradual progression, the daily duration was extended by five minutes each week so that the load increased at a comfortable pace across the intervention.

Statistical Analysis

Data were analysed in Jamovi. Descriptive statistics (mean and standard deviation) summarised the pre-test and post-test scores of each group. A 2×2 factorial analysis of covariance was then run separately for every variable, with the corresponding pre-test score treated as a covariate so that the groups were compared on an equal footing after baseline differences had been controlled. The level of significance was fixed at $p < .05$ throughout.

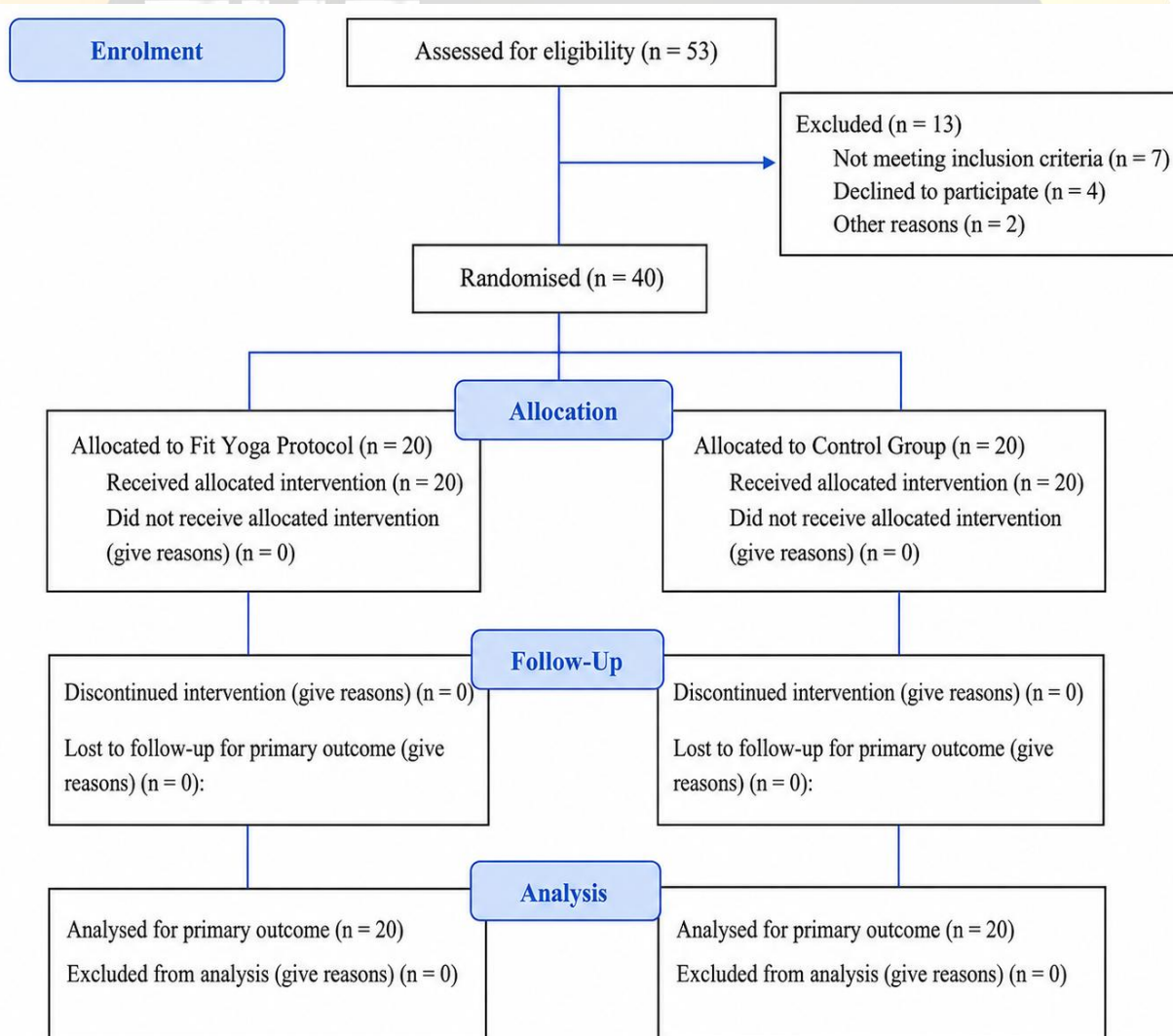


Figure 1. CONSORT 2025 flow diagram showing participant enrolment, randomization, allocation, follow-up, and analysis.



Results

Descriptive statistics for the pre-test and post-test scores of both groups are presented in Table 1. Both groups improved numerically from pre-test to post-test on every variable, but the change was consistently larger in the yoga group.

Variable	Group	Pre-test (M $\pm$ SD)	Post-test (M $\pm$ SD)
Flexibility (cm)	Yoga	15.8 $\pm$ 4.05	18.9 $\pm$ 4.74
	Control	12.8 $\pm$ 2.16	14.8 $\pm$ 2.88
Muscular endurance (push-ups)	Yoga	11.7 $\pm$ 4.21	16.1 $\pm$ 5.13
	Control	9.40 $\pm$ 2.68	13.8 $\pm$ 4.25
Static balance (s)	Yoga	19.3 $\pm$ 4.88	25.4 $\pm$ 7.51
	Control	15.7 $\pm$ 3.77	19.1 $\pm$ 4.75
Muscular strength (s)	Yoga	15.7 $\pm$ 4.37	20.6 $\pm$ 6.41
	Control	11.4 $\pm$ 2.78	14.2 $\pm$ 3.75

Table 1. Descriptive statistics for pre-test and post-test scores by group.

The results of the factorial analysis of covariance are summarised in Table 2, which reports the adjusted post-test means of both groups together with the F ratio and probability for the group effect, the gender effect and the Group $\times$ Gender interaction. All analyses were carried out with 1 and 36 degrees of freedom.

Variable	Adj M (Yoga)	Adj M (Control)	F (Group)	p	Gender p	Inter. p
Flexibility (cm)	19.65	14.80	12.56	.001*	.298	.355
Muscular endurance (push-ups)	16.50	13.90	2.44	.127	.548	.642
Static balance (s)	26.90	19.20	12.72	.001*	.157	.221
Muscular strength (s)	21.35	14.25	14.87	<.001*	.333	.435

Table 2. Adjusted post-test means and ANCOVA summary ($df = 1, 36$). Asterisk indicates a significant group effect at $p < .05$.

For flexibility, the group effect was significant, with the yoga group reaching an adjusted mean of 19.65 cm against 14.80 cm for the control group ($F = 12.56$, $p = .001$). This represents an improvement of roughly one-third in reach distance once baseline scores were controlled. Static balance followed the same pattern: the yoga group held Vrikshasana for an adjusted mean of 26.90 s compared with 19.20 s in the control group ($F = 12.72$, $p = .001$), an improvement of



about forty percent. The clearest effect appeared for muscular strength, where the yoga group held Naukasana for an adjusted mean of 21.35 s against 14.25 s in the control group ($F = 14.87$, $p < .001$).

Muscular endurance told a different story. Although the yoga group did improve numerically, from about 11.7 to 16.1 push-ups, the adjusted difference between the two groups was not statistically significant ($F = 2.44$, $p = .127$). Across all four variables, gender produced no significant effect (F ranging from 0.37 to 2.09, all $p > .05$), and the Group $\times$ Gender interaction was likewise non-significant throughout (all $p > .05$). Men and women therefore responded to the protocol in much the same way.

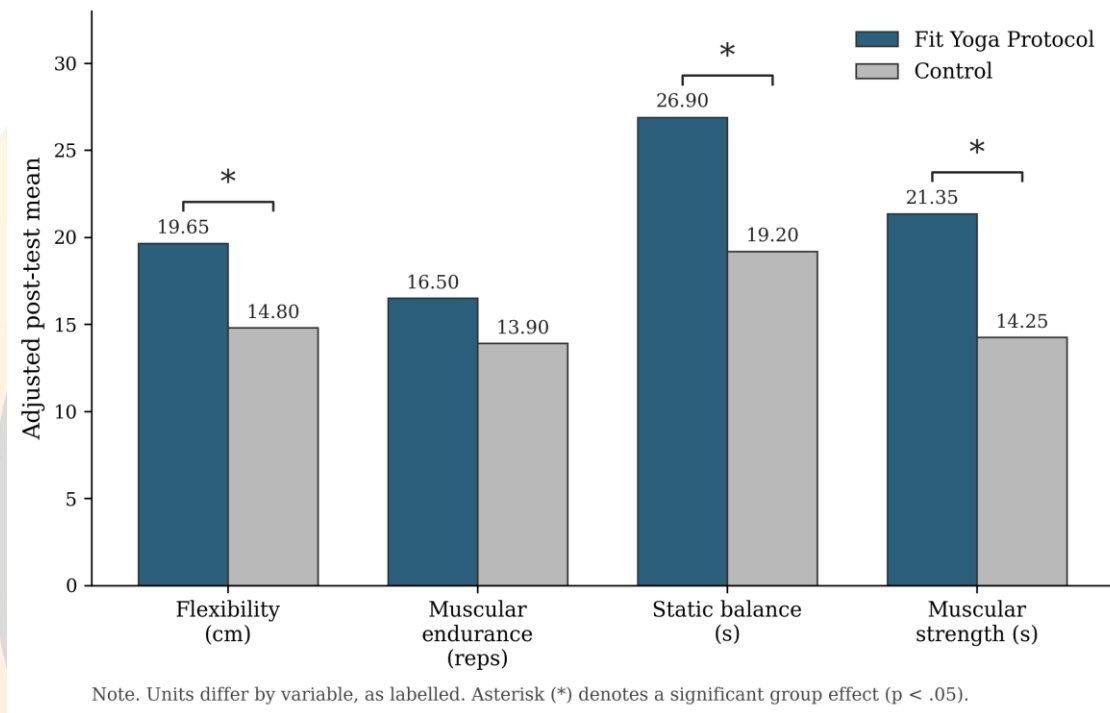


Figure 2. Adjusted post-test means for the Fit Yoga Protocol and control groups across the four fitness variables. Units differ by variable, as labelled. The asterisk marks a significant group effect at $p < .05$.

Discussion

The findings indicate that a short and simple yoga routine can improve three of the four fitness components examined here. Flexibility, static balance and muscular strength all rose significantly in the yoga group relative to controls, while muscular endurance did not. This selective pattern is consistent with the physical demands of the practice. Sustained stretching through postures such as Katichakrasana, Halasana and Dhanurasana lengthens the muscles of the back and hamstrings, which helps to explain the marked gain in reach distance (Grabara & Szopa, 2015). The balance-oriented work in Vrikshasana and Tadasana trains proprioception and postural control, and the isometric holds in Naukasana load the core and back muscles, which accounts for the strong effect on the strength measure. These results echo earlier evidence that yoga improves joint mobility and muscular strength in previously untrained adults (Polsgrove et al., 2016; Tran et al., 2001; Woodyard, 2011).



The absence of a significant effect on muscular endurance is worth noting. The endurance test relied on repeated dynamic push-ups, a movement pattern the protocol did not directly rehearse, since most of the asanas involved static holds rather than repetitive contractions of the upper-body pushing muscles. It is therefore reasonable that six weeks of this particular routine did little to raise push-up capacity. The point has a practical implication: where building muscular endurance is a specific goal, a yoga programme of this kind may need to be paired with some resistance or interval work, a conclusion that fits reviews comparing yoga with other forms of exercise (Ross & Thomas, 2010).

The size of the improvements is also worth placing in context. A gain of roughly a third in flexibility and of about forty percent in balance over only six weeks is substantial for a routine that took no more than fifteen to twenty minutes a day. Early controlled work on hatha yoga reported comparably large percentage gains in trunk flexibility and muscular strength after a few weeks of practice (Tran et al., 2001), and pilot studies of asana practice have described parallel improvements in perceived and measured physical function (Cowen & Adams, 2005). The present results extend that evidence to a working Indian adult population and to a protocol deliberately kept short so that it could realistically fit into a working day. It is likely that the steady weekly increase in session length, together with the progressive nature of the postures, helped participants adapt without discomfort and contributed to the observed effects.

Gender did not shape any of the outcomes, and there was no interaction between gender and the intervention. In practical terms this means that a single, common protocol worked equally well for male and female employees and did not need to be adjusted by sex. For organisations planning wellness activities, this is a useful and simplifying result, because mixed groups can follow the same session. The findings also add to the small but growing body of Indian workplace research showing that yoga can be delivered feasibly and cheaply within the work environment (Biman et al., 2021; Wolever et al., 2012), and they align the practice with the broader goals of the Fit India Movement (Mohanty & Ganesh, 2024).

Several limitations temper these conclusions. The sample was small, at forty participants, and the intervention lasted only six weeks, so the durability of the gains beyond this window is unknown. Participants were drawn from a limited set of companies, which restricts how widely the results can be generalised. Dietary intake and sleep were not controlled and were reported by participants themselves, adherence to the routine varied, and outcome assessors were not blinded. Future work would benefit from larger samples, longer follow-up, objective measures and the inclusion of physiological or psychological outcomes alongside the physical ones examined here.

Conclusion

A six-week Fit Yoga Protocol significantly improved flexibility, static balance and muscular strength among corporate employees, while leaving muscular endurance largely unchanged. The benefits appeared regardless of gender, which supports the use of a single, shared routine in mixed workplace groups. Given its low cost, minimal equipment and modest time demand, a



protocol of this kind is a practical addition to corporate wellness programmes, especially where the aim is to counter the flexibility, balance and postural deficits that follow from long hours of sitting. Pairing it with endurance-focused activity would give a more complete fitness stimulus.

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